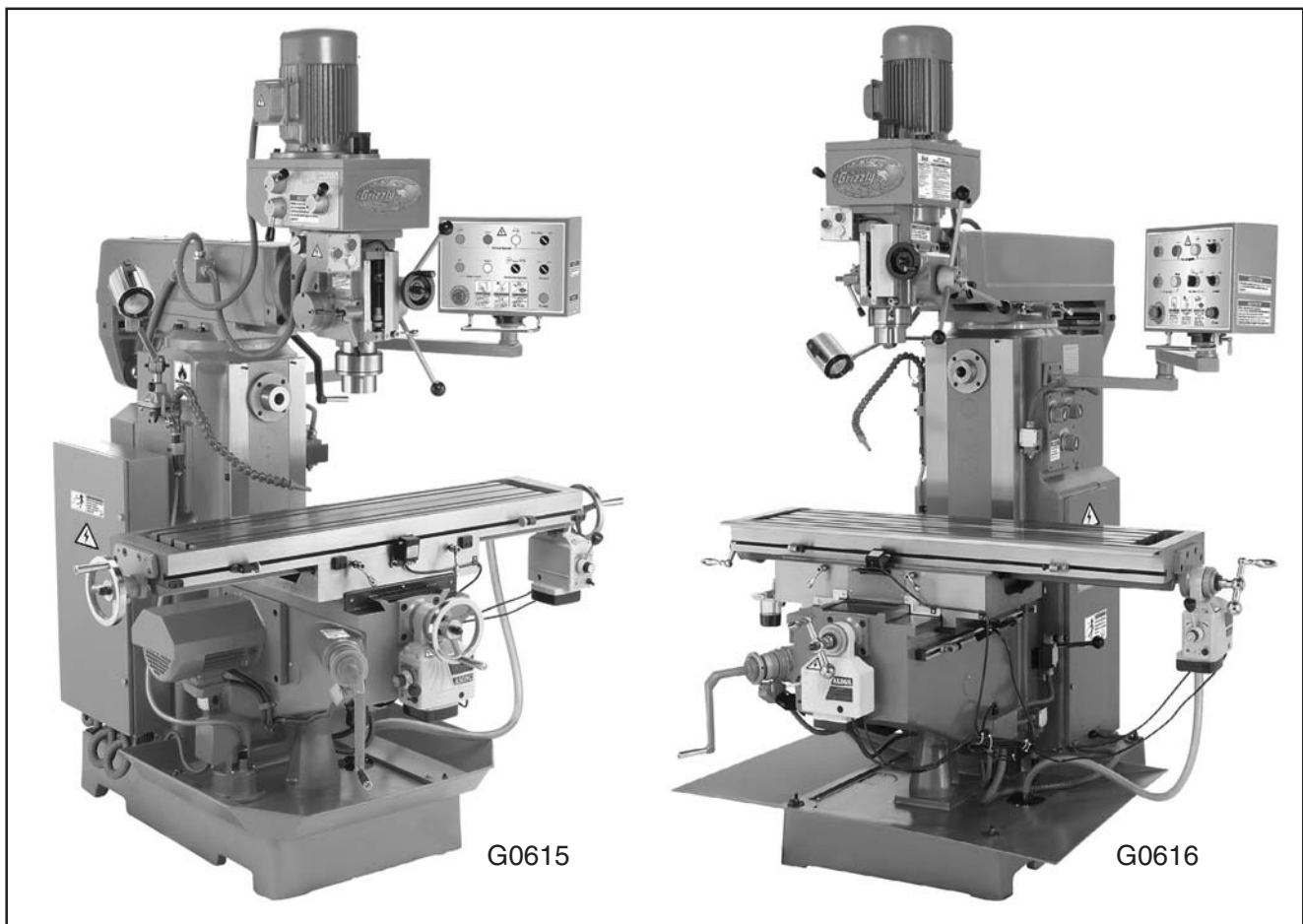


Grizzly *Industrial, Inc.*®

MODEL G0615/G0616 HORIZONTAL/VERTICAL MILL OWNER'S MANUAL



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WARNING: NO PORTION OF THIS MANUAL MAY BE REPRODUCED IN ANY SHAPE
OR FORM WITHOUT THE WRITTEN APPROVAL OF GRIZZLY INDUSTRIAL, INC.
#TS9061 PRINTED IN CHINA

 **WARNING!**

This manual provides critical safety instructions on the proper setup, operation, maintenance and service of this machine/equipment.

Failure to read, understand and follow the instructions given in this manual may result in serious personal injury, including amputation, electrocution or death.

The owner of this machine/equipment is solely responsible for its safe use. This responsibility includes but is not limited to proper installation in a safe environment, personnel training and usage authorization, proper inspection and maintenance, manual availability and comprehension, application of safety devices, blade/cutter integrity, and the usage of personal protective equipment.

The manufacturer will not be held liable for injury or property damage from negligence, improper training, machine modifications or misuse.

 **WARNING!**

Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:

- **Lead from lead-based paints.**
- **Crystalline silica from bricks, cement and other masonry products.**
- **Arsenic and chromium from chemically-treated lumber.**

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: Work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

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INTRODUCTION

Foreword

We are proud to offer the Model G0615/G0616 Horizontal/Vertical Mill. This machine is part of a growing Grizzly family of fine metalworking machinery. When used according to the guidelines set forth in this manual, you can expect years of trouble-free, enjoyable operation and proof of Grizzly's commitment to customer satisfaction.

The specifications, drawings, and photographs illustrated in this manual represent the Model G0615/G0616 when the manual was prepared. However, owing to Grizzly's policy of continuous improvement, changes may be made at any time with no obligation on the part of Grizzly.

For your convenience, we always keep current Grizzly manuals available on our website at **www.grizzly.com**. Any updates to your machine will be reflected in these manuals as soon as they are complete. Visit our site often to check for the latest updates to this manual!

Contact Info

If you have any comments regarding this manual, please write to us at the address below:

Grizzly Industrial, Inc.
c/o Technical Documentation Manager
P.O. Box 2069
Bellingham, WA 98227-2069
Email: manuals@grizzly.com

We stand behind our machines. If you have any service questions or parts requests, please call or write us at the location listed below.

Grizzly Industrial, Inc.
1203 Lycoming Mall Circle
Muncy, PA 17756
Phone: (570) 546-9663
Fax: (800) 438-5901
E-Mail: techsupport@grizzly.com
Web Site: <http://www.grizzly.com>





MACHINE DATA SHEET

Customer Service #: (570) 546-9663 • To Order Call: (800) 523-4777 • Fax #: (800) 438-5901

MODEL G0615 HORIZONTAL/VERTICAL MILL

Product Dimensions:

Weight2977 lbs.
 Length/Width/Height59¼" x 50½" x 84⅝"
 Foot Print (Length/Width).....40½" x 23½"

Shipping Dimensions:

Type Wood
 Content..... Machine
 Weight.....3300 lbs.
 Length/Width/Height..... 60" x 51" x 85"

Electrical:

Switch..... Rotary ON/OFF
 Switch Voltage220V
 Power Cord Length 6 ft.
 Power Cord Gauge 10 gauge
 Recommended Breaker Size20A
 Phase ConverterModel G5845

Motors:

Vertical Spindle Motor

Type TEFC Induction
 Horsepower..... 3 HP
 Voltage220V
 Phase3-Phase
 Amps9A
 Speed1725 RPM
 Cycle60 Hz
 Number Of Speeds 1
 Power Transfer Gear Drive
 Bearings Shielded and Lubricated

Horizontal Spindle Motor

Type TEFC Induction
 Horsepower..... 3 HP
 Voltage220V
 Phase3-Phase
 Amps9A
 Speed1725 RPM
 Cycle60 Hz
 Number Of Speeds 1
 Power Transfer Belt and Gear Drive
 Bearings Shielded and Lubricated



Table Elevation Motor

Type	TEFC Induction
Horsepower.....	1 HP
Voltage.....	220V
Phase.....	3-Phase
Amps.....	4A
Speed.....	875 RPM
Cycle	60 Hz
Number Of Speeds.....	1
Power Transfer	Gear
Bearings.....	Shielded and Lubricated

Longitudinal and Cross Feed Motors

Type	Asong-235
Maximum Torque	135 in.-lb.
Voltage.....	110V
Phase.....	1-Phase
Amps.....	2A
Speed.....	Variable
Cycle	60 Hz
Power Transfer	Gear Drive
Bearings.....	Shielded and Lubricated

Coolant Pump Motor

Type	TEFC Induction
Horsepower.....	0.05 HP
Voltage.....	220V
Phase.....	3-Phase
Amps.....	0.41A
Cycle	60 Hz
Power Transfer	Gear
Bearings.....	Shielded and Lubricated

Main Specifications:

Operation Information

Spindle Travel.....	47/8"
Swing44"
Longitudinal Table Travel.....	29 1/2"
Cross Table Travel.....	11 1/2"
Vertical Table Travel.....	11 1/4"
Ram Travel	21 5/8"
Ram Swivel.....	360 deg.
Head Swivel.....	Left 90 deg., Right 90 deg.
Maximum Distance Vertical Spindle to Column.....	23 7/8"
Maximum Distance to Vertical Spindle Table.....	15 5/8"
Drilling Capacity for Cast Iron.....	1 1/8"
Drilling Capacity for Steel	3/4"
Maximum Distance Horizontal Spindle Center to Table.....	12 1/2"
Number of Vertical Spindle Speeds.....	8
Range of Vertical Spindle Speeds.....	108, 192, 317, 468, 552, 828, 1356, 2400 RPM
Number of Horizontal Spindle Speeds.....	12
Range of Horizontal Spindle Speeds.....	48, 72, 96, 132, 180, 240, 324, 456, 612, 816, 1140, 1560 RPM
Number of Longitudinal Feed Rates.....	Variable
Range of Longitudinal Feed Rates	0.2-36 in./min.
Longitudinal Lead Screw TPI.....	5 TPI
Number of Cross Feed Rates	Variable
Range of Longitudinal Feed Rates	0.2-36 in./min.
Cross Lead Screw TPI.....	5 TPI



Spindle Information

Vertical Spindle Taper.....	R-8
Spindle Bearing Type.....	Taper Roller
End Milling Capacity	1"
Face Milling Capacity.....	3/8"
Draw Bar Diameter	3/8"
Draw Bar TPI	20 TPI
Draw Bar Length.....	19 9/16"
Horizontal Spindle Taper	R-8
Horizontal Spindle Sizes.....	1, 1 1/4"
Horizontal Bearing Type	Taper Roller

Table Information

Table Length.....	50"
Table Width.....	10 1/4"
Table Thickness.....	4 1/8"
Number of T-Slots.....	3
T-Slot Width	5/8"
T-Slot Height.....	5/8"
T-Slot Centers.....	2 1/2"
Stud Size.....	1/2"

Construction Information

Spindle Housing.....	Cast Iron
Table	Ground Cast Iron
Headstock	Cast Iron
Column.....	Cast Iron
Base	Cast Iron
Paint.....	Powder Coat

Other Specifications:

Country of Origin.....	China
Warranty.....	1 Year
Serial Number Location	Machine ID Label on Head Casting

Features:

- Centralized Control Panel
- Auxillary Forward/Reverse/Stop for Vertical Spindle
- Job Button for Horizontal Spindle
- 3-Axis Powerfeed Including Knee
- Adjustable Limit Switches for All 3 Axes
- Power Down Feed on Quill With 3 Feed Rates
- Quill Auto-Stop and Return
- Power Tapping Feature With Auto-Reverse

Accessories Included:

- 5/8" Drill Chuck With Arbor
- R-8 to MT#3 Adapter Sleeve
- R-8 to MT#2 Adapter Sleeve
- 1" Horizontal Arbor With Spacers
- 1 1/4" Horizontal Arbor With Spacers
- Two Draw Bars
- 6" Machine Vise
- Set of 13 R-8 Collets, 1/8-7/8" by 1/16"
- Wrenches





MACHINE DATA SHEET

Customer Service #: (570) 546-9663 • To Order Call: (800) 523-4777 • Fax #: (800) 438-5901

MODEL G0616 HORIZONTAL/VERTICAL MILL

Product Dimensions:

Weight4410 lbs.
 Length/Width/Height67³/₈" x 67³/₄" x 91³/₄"
 Foot Print (Length/Width).....45" x 27¹/₂"

Shipping Dimensions:

Type Wood
 Content..... Machine
 Weight.....4730 lbs.
 Length/Width/Height..... 68" x 68" x 92"

Electrical:

Switch..... Rotary ON/OFF
 Switch Voltage220V
 Power Cord Length 6 ft.
 Power Cord Gauge 10 gauge
 Recommended Breaker Size20A
 Phase ConverterModel G5845

Motors:

Vertical Spindle Motor

Type TEFC Induction
 Horsepower..... 3 HP
 Voltage 220V
 Phase 3-Phase
 Amps 9A
 Speed 1725 RPM
 Cycle 60 Hz
 Number Of Speeds 1
 Power Transfer Gear Drive
 Bearings..... Shielded and Lubricated

Horizontal Spindle Motor

Type TEFC Induction
 Horsepower..... 3 HP
 Voltage 220V
 Phase 3-Phase
 Amps 9A
 Speed 1725 RPM
 Cycle 60 Hz
 Number Of Speeds 1
 Power Transfer Belt and Gear Drive
 Bearings..... Shielded and Lubricated



Table Elevation Motor

Type	TEFC Induction
Horsepower.....	1 HP
Voltage.....	220V
Phase.....	3-Phase
Amps.....	4A
Speed.....	875 RPM
Cycle	60 Hz
Number Of Speeds	1
Power Transfer	Gear
Bearings.....	Shielded and Lubricated

Longitudinal and Cross Feed Motors

Type	Asong-235
Maximum Torque	135 in.-lb.
Voltage.....	110V
Phase.....	1-Phase
Amps.....	2A
Speed.....	Variable
Cycle	60 Hz
Power Transfer	Gear Drive
Bearings.....	Shielded and Lubricated

Coolant Pump Motor

Type	TEFC Induction
Horsepower.....	0.12 HP
Voltage.....	220V
Phase.....	3-Phase
Amps.....	1A
Cycle	60 Hz
Power Transfer	Gear
Bearings.....	Shielded and Lubricated

Main Specifications:

Operation Information

Spindle Travel	47/8"
Swing	61"
Longitudinal Table Travel.....	263/8"
Cross Table Travel.....	10"
Vertical Table Travel	153/4"
Ram Travel	305/8"
Ram Swivel	360 deg.
Head Swivel	Left 90 deg., Right 90 deg.
Maximum Distance Vertical Spindle to Column.....	305/8"
Maximum Distance Vertical Spindle to Table	223/4"
Drilling Capacity for Cast Iron.....	11/8"
Drilling Capacity for Steel	3/4"
Maximum Distance Horizontal Spindle Center to Table	181/2"
Number of Vertical Spindle Speeds.....	8
Range of Vertical Spindle Speeds	108, 192, 317, 468, 552, 828, 1356, 2400 RPM
Number of Horizontal Spindle Speeds.....	12
Range of Horizontal Spindle Speeds.....	48, 72, 96, 132, 180, 240, 324, 456, 612, 816, 1140, 1560 RPM
Number of Longitudinal Feed Rates	Variable
Range of Longitudinal Feed Rates	0.2–36 in./min.
Longitudinal Lead Screw TPI.....	5 TPI
Number of Cross Feed Rates	Variable
Range of Longitudinal Feed Rates	0.2–36 in./min.
Cross Lead Screw TPI.....	5 TPI



Spindle Information

Vertical Spindle Taper.....	R-8
Spindle Bearing Type.....	Taper Roller
End Milling Capacity	1"
Face Milling Capacity.....	3/8"
Draw Bar Diameter	3/8"
Draw Bar TPI	20 TPI
Draw Bar Length.....	19 5/8"
Horizontal Spindle Taper	R-8
Horizontal Spindle Sizes.....	1", 1 1/4"
Horizontal Bearing Type	Taper Roller

Table Information

Table Length.....	51 5/8"
Table Width.....	12 7/8"
Table Thickness.....	4 3/4"
Number of T-Slots.....	3
T-Slot Width	5/8"
T-Slot Height.....	5/8"
T-Slot Centers.....	2 1/2"
Stud Size.....	1/2"

Construction Information

Spindle Housing.....	Cast Iron
Table	Ground Cast Iron
Headstock	Cast Iron
Column.....	Cast Iron
Base	Cast Iron
Paint.....	Powder Coat

Other Specifications:

Country of Origin.....	China
Warranty.....	1 Year
Serial Number Location	Machine ID Label on Head Casting

Features:

- Centralized Control Panel
- Auxillary Forward/Reverse/Stop for Vertical Spindle
- Job Button for Horizontal Spindle
- 3-Axis Powerfeed Including Knee
- Adjustable Limit Switches for All 3 Axes
- Power Down Feed on Quill With 3 Feed Rates
- Quill Auto-Stop and Return
- Power Tapping Feature With Auto-Reverse

Accessories Included:

- 5/8" Drill Chuck With Arbor
- R-8 to MT#3 Adapter Sleeve
- R-8 to MT#2 Adapter Sleeve
- 1" Horizontal Arbor With Spacers
- 1 1/4" Horizontal Arbor With Spacers
- Two Draw Bars
- 6" Machine Vise
- Set of 13 R-8 Collets, 1/8-7/8" by 1/16"
- Wrenches



Identification

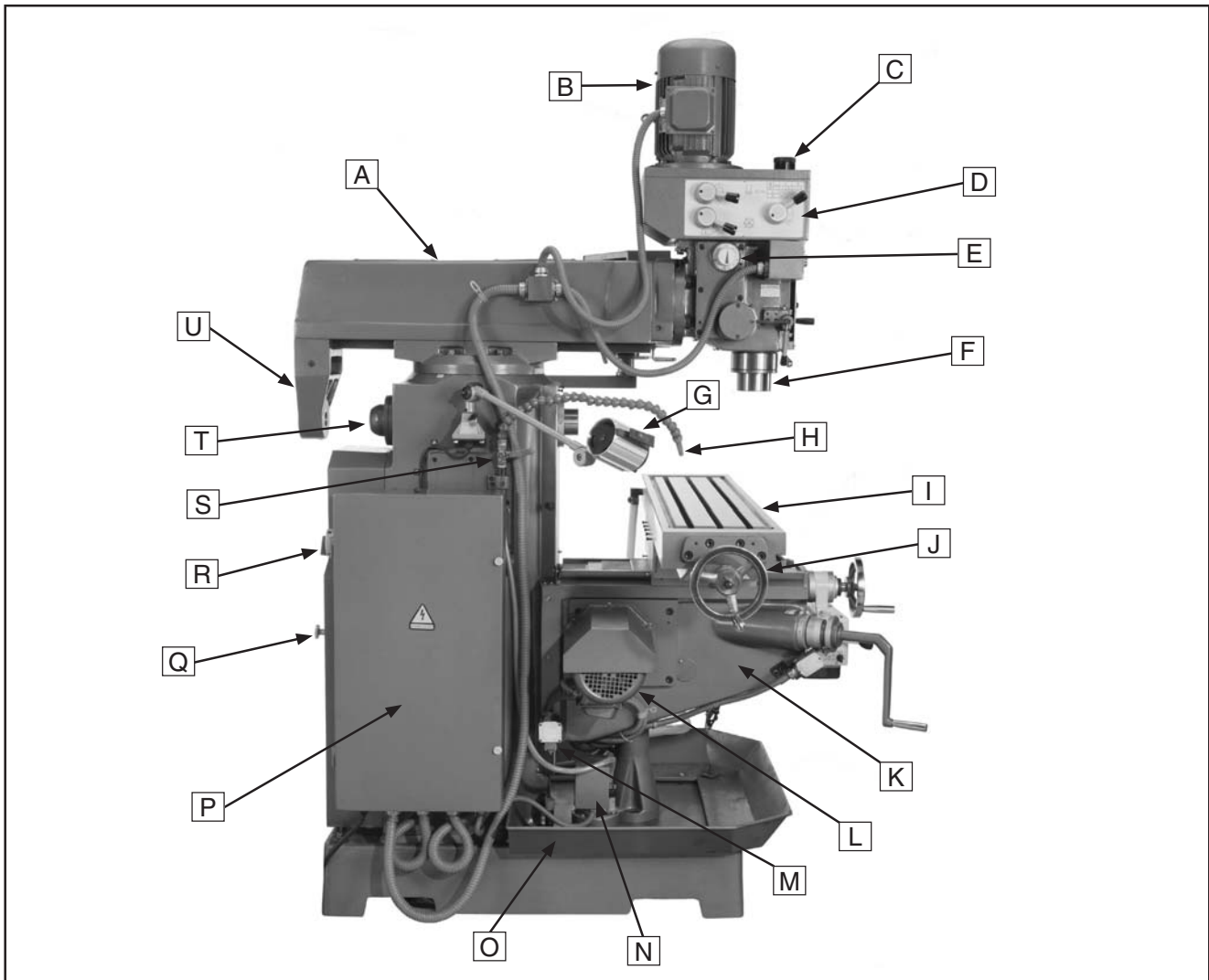


Figure 1. Left side (Model G0615 shown).

- | | |
|---|--|
| A. Ram | L. Z-Axis (Knee) Power Feed Motor |
| B. Vertical Spindle Motor | M. Lower Z-Axis (Knee) Limit Switch |
| C. Vertical Drawbar Cap | N. Coolant Pump |
| D. Vertical Spindle Speed Controls | O. Coolant Splash Pan |
| E. Auto-Downfeed Speed Control | P. Electrical Box |
| F. Vertical Spindle | Q. Horizontal Spindle Motor Access |
| G. Work Light | R. Main Power Switch |
| H. Coolant Nozzle | S. Coolant Valve |
| I. Mill Table | T. Outboard Horizontal Spindle |
| J. X-Axis (Longitudinal) Handwheel (Left Side) | U. Horizontal Arbor Support |
| K. Knee | |



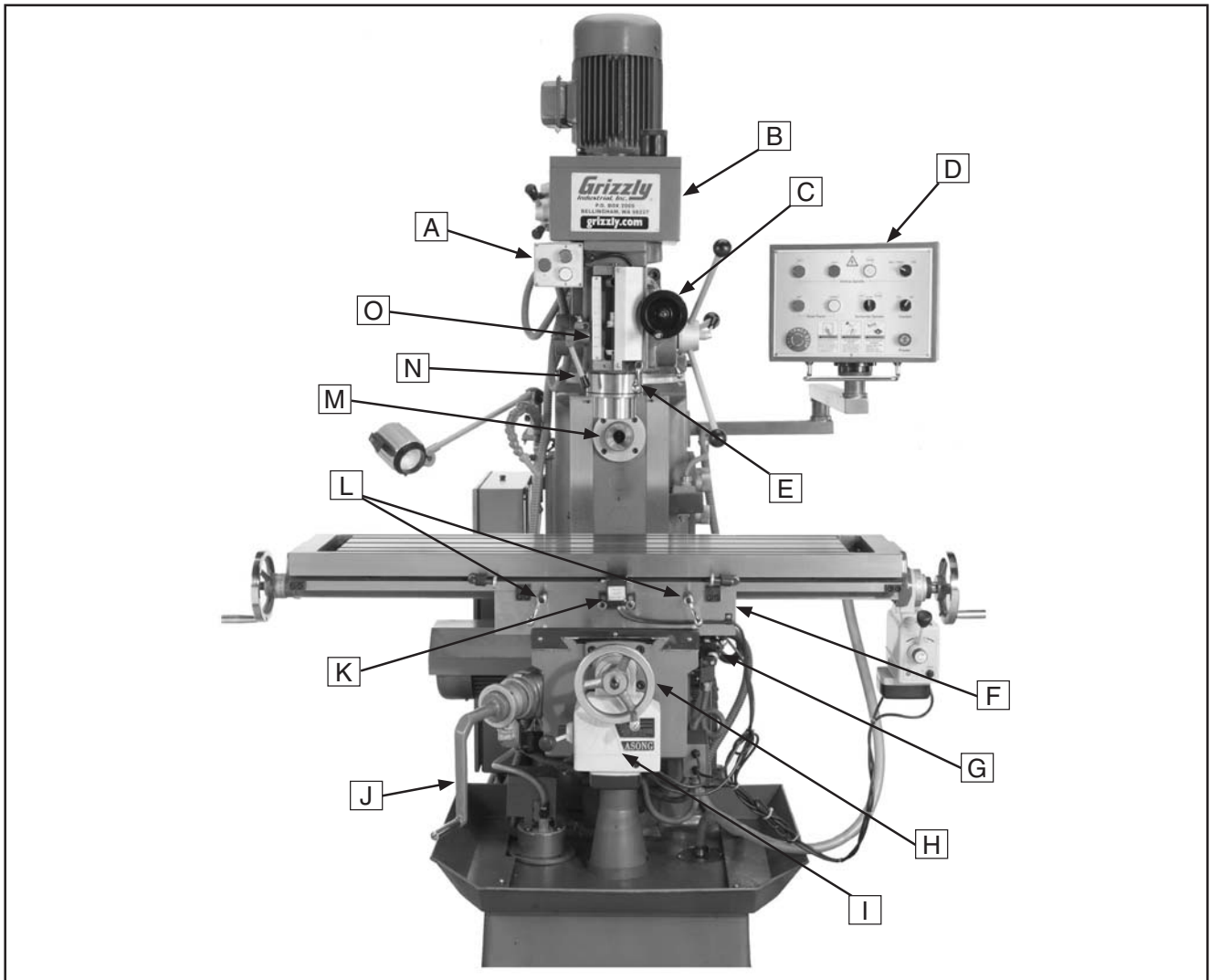


Figure 2. Front (Model G0615 shown).

- | | |
|---------------------------------------|--|
| A. Vertical Spindle Controls | I. Y-Axis Power Feed |
| B. Vertical Spindle Gearbox | J. Z-Axis (Knee) Crank |
| C. Fine Downfeed Handwheel | K. X-Axis (Longitudinal) Limit Switch |
| D. Control Panel | L. X-Axis Table Locking Levers |
| E. Quill Locking Lever | M. Horizontal Spindle |
| F. Saddle | N. Auto-Downfeed Lever |
| G. Y-Axis (Cross) Limit Switch | O. Auto-Downfeed Scale and Depth Stop |
| H. Y-Axis Handwheel | |



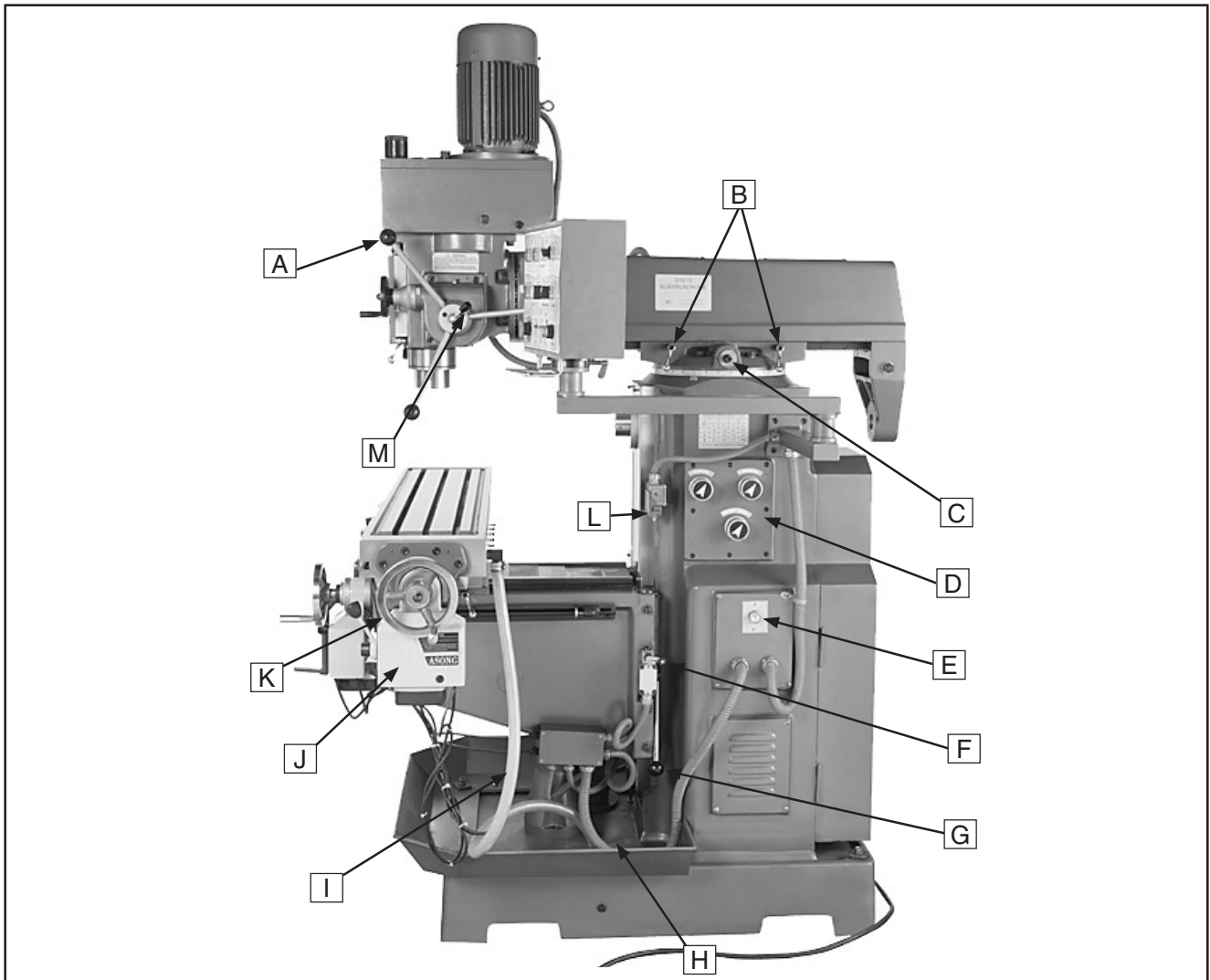


Figure 3. Right side (Model G0615 shown).

- | | |
|---|--|
| A. Large Downfeed Handwheel | H. Coolant Drain Screen |
| B. Ram Locking Levers | I. Coolant Return Hose |
| C. Ram Linear Drive Nut | J. X-Axis (Longitudinal) Power Feed |
| D. Horizontal Spindle Speed Controls | K. X-Axis Handwheel (Right Side) |
| E. Horizontal Spindle Jog Button | L. Upper Z-Axis (Knee) Limit Switch |
| F. Z-Axis (Knee) Lock Limit Switch | M. Downfeed Clutch Lever |
| G. Knee Locking Lever | |



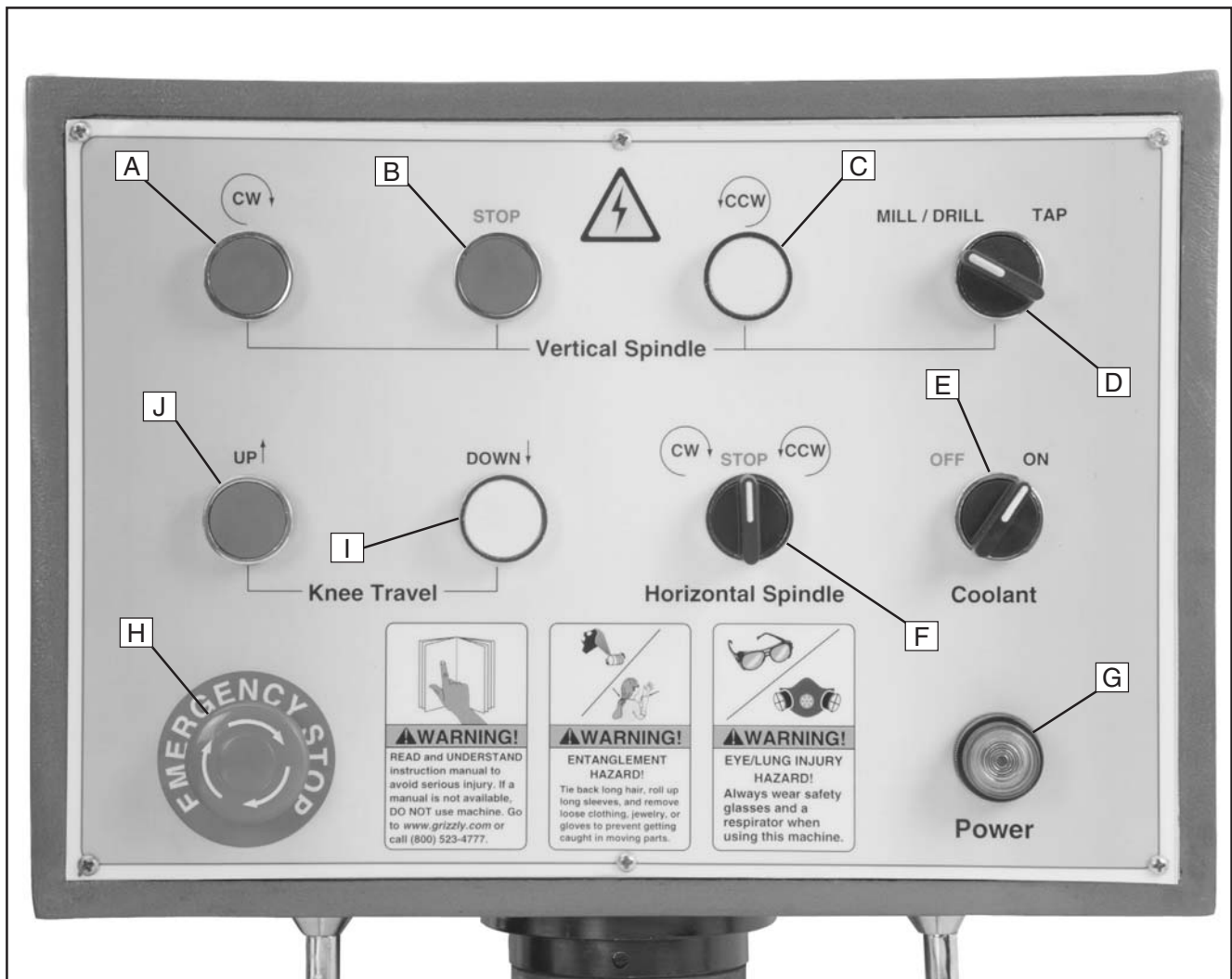


Figure 4. Control panel.

- A. **Vertical Spindle Clockwise:** Use this button to rotate the vertical spindle clockwise.
- B. **Vertical Spindle Stop:** Press this button to stop the vertical spindle.
- C. **Vertical Spindle Counterclockwise:** Use this button to rotate the vertical spindle counterclockwise.
- D. **Vertical Spindle Mode Selector:** Choose either Mill/Drill or Tap mode for the vertical spindle with this two-position switch.
- E. **Coolant Pump:** This switch turns the coolant pump **ON** and **OFF**.
- F. **Horizontal Spindle:** Select clockwise rotation, stop, or counterclockwise rotation for the horizontal spindle with this switch.
- G. **Power Button & Lamp:** Make sure the Horizontal Spindle switch is in the middle STOP position, then press this button to flow power to all motors and powered controls.
- H. **Emergency Stop:** When pressed, will stop all power to all motors—horizontal or vertical spindle, table power feeds, and coolant pump. This button must be twisted clockwise to pop it out and enable power to be reset.
- I. **Knee (Z-Axis) Down Travel:** Hold this button in to move the knee down.
- J. **Knee Up Travel:** Hold this button in to move the knee up.



SECTION 1: SAFETY

WARNING

For Your Own Safety, Read Instruction Manual Before Operating this Machine

The purpose of safety symbols is to attract your attention to possible hazardous conditions. This manual uses a series of symbols and signal words intended to convey the level of importance of the safety messages. The progression of symbols is described below. Remember that safety messages by themselves do not eliminate danger and are not a substitute for proper accident prevention measures.



Indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, **COULD** result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE

This symbol is used to alert the user to useful information about proper operation of the machine.

WARNING

Safety Instructions for Machinery

- 1. READ THE ENTIRE MANUAL BEFORE STARTING MACHINERY.** Machinery presents serious injury hazards to untrained users.
- 2. ALWAYS USE ANSI APPROVED SAFETY GLASSES WHEN OPERATING MACHINERY.** Everyday eyeglasses only have impact resistant lenses—they are NOT safety glasses.
- 3. ALWAYS WEAR A NIOSH APPROVED RESPIRATOR WHEN OPERATING MACHINERY THAT PRODUCES DUST.** Wood dust can cause severe respiratory illnesses.
- 4. ALWAYS USE HEARING PROTECTION WHEN OPERATING MACHINERY.** Machinery noise can cause permanent hearing loss.
- 5. WEAR PROPER APPAREL. DO NOT** wear loose clothing, gloves, neckties, rings, or jewelry that can catch in moving parts. Wear protective hair covering to contain long hair and wear non-slip footwear.
- 6. NEVER OPERATE MACHINERY WHEN TIRED OR UNDER THE INFLUENCE OF DRUGS OR ALCOHOL.** Be mentally alert at all times when running machinery.



WARNING

Safety Instructions for Machinery

7. **ONLY ALLOW TRAINED AND PROPERLY SUPERVISED PERSONNEL TO OPERATE MACHINERY.** Make sure operation instructions are safe and clearly understood.
8. **KEEP CHILDREN AND VISITORS AWAY.** Keep all children and visitors a safe distance from the work area.
9. **MAKE WORKSHOP CHILDPROOF.** Use padlocks, master switches, and remove start switch keys.
10. **NEVER LEAVE WHEN MACHINE IS RUNNING.** Turn power **OFF** and allow all moving parts to come to a complete stop before leaving machine unattended.
11. **DO NOT USE IN DANGEROUS ENVIRONMENTS.** DO NOT use machinery in damp, wet locations, or where any flammable or noxious fumes may exist.
12. **KEEP WORK AREA CLEAN AND WELL LIGHTED.** Clutter and dark shadows may cause accidents.
13. **USE A GROUNDED EXTENSION CORD RATED FOR THE MACHINE AMPERAGE.** Grounded cords minimize shock hazards. Undersized cords create excessive heat. Always replace damaged extension cords.
14. **ALWAYS DISCONNECT FROM POWER SOURCE BEFORE SERVICING MACHINERY.** Make sure switch is in OFF position before reconnecting.
15. **MAINTAIN MACHINERY WITH CARE.** Keep blades sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.
16. **MAKE SURE GUARDS ARE IN PLACE AND WORK CORRECTLY BEFORE USING MACHINERY.**
17. **REMOVE ADJUSTING KEYS AND WRENCHES.** Make a habit of checking for keys and adjusting wrenches before turning machinery **ON**.
18. **CHECK FOR DAMAGED PARTS BEFORE USING MACHINERY.** Check for binding or misaligned parts, broken parts, loose bolts, and any other conditions that may impair machine operation. Repair or replace damaged parts before operation.
19. **USE RECOMMENDED ACCESSORIES.** Refer to the instruction manual for recommended accessories. Improper accessories increase risk of injury.
20. **DO NOT FORCE MACHINERY.** Work at the speed for which the machine or accessory was designed.
21. **SECURE WORKPIECE.** Use clamps or a vise to hold the workpiece when practical. A secured workpiece protects your hands and frees both hands to operate the machine.
22. **DO NOT OVERREACH.** Maintain stability and balance at all times.
23. **MANY MACHINES CAN EJECT WORKPIECES TOWARD OPERATOR.** Know and avoid conditions that cause the workpiece to "kickback."
24. **ALWAYS LOCK MOBILE BASES (IF USED) BEFORE OPERATING MACHINERY.**
25. **CERTAIN DUST MAY BE HAZARDOUS** to the respiratory systems of people and animals, especially fine dust. Be aware of the type of dust you are exposed to and always wear a respirator designed to filter that type of dust.



WARNING

Additional Safety Instructions For Mills

- 1. UNDERSTANDING CONTROLS.** Make sure you understand the use and operation of all controls.
- 2. SAFETY ACCESSORIES.** Always use a chip guard in addition to your safety glasses when milling to prevent bodily injury.
- 3. WORK HOLDING.** Before starting the machine, be certain the workpiece has been properly clamped to the table. NEVER hold the workpiece by hand when using the mill.
- 4. CHUCK KEY SAFETY.** Always remove your chuck key, drawbar wrench, and any service tools immediately after use.
- 5. SPINDLE SPEEDS.** Select the spindle speed that is appropriate for the type of work and material. Allow the mill to gain full speed before beginning a cut.
- 6. POWER DISRUPTION.** In the event of a local power outage during use of the mill, turn **OFF** all switches to avoid possible sudden start up once power is restored.
- 7. SPINDLE DIRECTION CHANGES.** Never reverse spindle direction while the spindle is in motion.
- 8. STOPPING SPINDLE.** DO NOT stop the spindle using your hand.
- 9. CLEAN-UP.** DO NOT clear chips by hand or compressed air. Use a brush, and never clear chips while the mill is turning.
- 10. MACHINE CARE AND MAINTENANCE.** Never operate the mill with damaged or worn parts. Maintain your mill in proper working condition. Perform routine inspections and maintenance promptly. Put away adjustment tools after use.
- 11. DISCONNECT POWER.** Make sure the mill is turned **OFF**, disconnected from its power source and all moving parts have come to a complete stop before starting any inspection, adjustment, or maintenance procedure.
- 12. AVOIDING ENTANGLEMENT.** Keep loose clothing articles such as sleeves, belts or jewelry items away from the mill spindle. Never wear gloves when mill is in operation.
- 13. TOOL HOLDING.** Always use the proper tools for your operation. Make sure tools are held firmly in place.
- 14. CUTTING TOOL INSPECTION.** Inspect drills and end mills for sharpness, chips, or cracks before each use. Replace dull, chipped, or cracked cutting tools immediately. Handle new cutting tools with care. Leading edges are very sharp and can cause lacerations.
- 15. BE ATTENTIVE.** DO NOT leave mill running unattended for any reason.
- 16. EXPERIENCING DIFFICULTIES.** If at any time you are experiencing difficulties performing the intended operation, stop using the machine! Contact our Technical Support at (570) 546-9663.

WARNING

Like all machinery there is potential danger when operating this mill. Accidents are frequently caused by lack of familiarity or failure to pay attention. Use this mill with respect and caution to lessen the possibility of operator injury. If normal safety precautions are overlooked or ignored, serious personal injury may occur.



Glossary of Terms

The following is a list of common definitions, terms and phrases used throughout this manual as they relate to this mill and metalworking in general. Become familiar with these terms for assembling, adjusting and operating this mill. Your safety is **VERY** important to us at Grizzly!

Arbor: A machine shaft that supports a cutting tool.

Collet: A conical shaped split-sleeve bushing that holds round tools by their outside diameter.

Cutting Speed: The distance a point on a cutter moves in one minute, expressed in surface meters or feet per minute.

Dial Indicator: An instrument used in setup and inspection work that shows the amount of error in size or alignment of a part.

Dividing Head: A milling machine accessory used to divide a circular object into a number of equal parts.

Down or Climb Milling: Feeding the workpiece in the same or opposite direction as the cutter rotation.

End Milling: The operation of machining flat surfaces either horizontal, vertical, or at an angle using an end mill as a cutter.

Face Milling: The milled surface in this method results from the combined action of cutting edges located on the face or end of the cutting tools.

Feed: Usually measured in inches per minute. It is the product of feed per tooth times revolutions per minute times the number of teeth in the cutter.

Fixture: A device that securely holds the workpiece in place during a cutting operation.

Form Milling: The machining of irregular contours by using form cutters.

Gang Milling: When more than two cutters are mounted on the arbor to machine surfaces of a workpiece.

Gib: A tapered wedge located along a sliding member to take up wear or to ensure a proper fit.

Headstock: The mill component that houses the vertical spindle, motor, and drive system.

Knee: The mill device that the saddle and table are mounted on and can move along the Z-axis path.

Lead Screw: The device that moves the table along the X-axis, Y-axis, and Z-axis paths.

Peripheral Milling: The milled surface in this method is produced by cutting teeth located on the periphery (outer edge) of the cutter body.

Ram: The mill component that holds the headstock and moves in a linear path across the column.

Saddle: The sliding component that holds the table and moves along the Y-axis path.

Side Milling: The operation of machining a vertical surface on the side of a workpiece using a side milling cutter.

Slitting and Cutting Off: Metal slitting saws are used for milling narrow slots and for cutting off stock.

Spindle: The revolving hollow shaft that holds and drives the tool holder or arbor.

Turret: The top part of the column that the ram rotates on.

Ways: The precision machined and flat tracks on the mill on which the table, saddle, and knee travel.

X, Y, and Z-Axis: The straight path the table can travel longitudinally, crosswise, or vertically respectively.



SECTION 2: CIRCUIT REQUIREMENTS

⚠️ WARNING

Serious personal injury could occur if you connect the machine to the power source before you have completed the setup process. DO NOT connect the machine to the power source until instructed to do so.

Full Load Amperage Draw

G0615 220V 3-Phase 16.5 Amps
 G0616 220V 3-Phase 16.5 Amps

Circuit Requirements

We recommend connecting your machine to a dedicated and grounded circuit that is rated for the amperage given below. Never replace a circuit breaker on an existing circuit with one of higher amperage without consulting a qualified electrician to ensure compliance with wiring codes. **If you are unsure about the wiring codes in your area or you plan to connect your machine to a shared circuit, consult a qualified electrician. All electrical connections must be made in accordance with local codes and ordinances.**

G0615 220V 3-Phase20 Amp
 G0616 220V 3-Phase20 Amp

Minimum Cord Requirements

For 220V connection, we recommend using a stranded-copper flexible cord that meets the minimum criteria listed below, does not exceed 50 ft., and has an insulation type that starts with "S." The exact insulation type should account for any exposure to moisture, heat, and oils in the working environment. A qualified electrician should determine the best cord to use in your environment.

220V Plug/Connection Type

G0615 220V 3-Phase L15-20
 G0616 220V 3-Phase L15-20

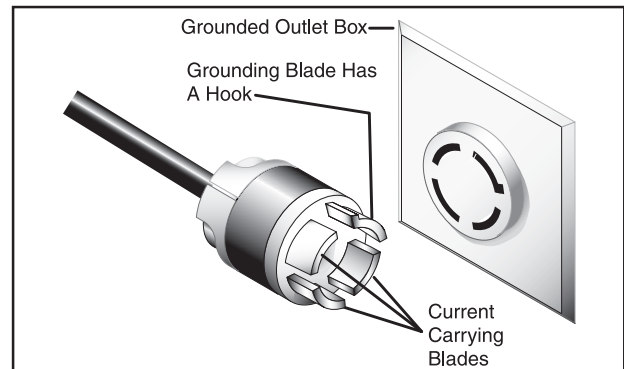
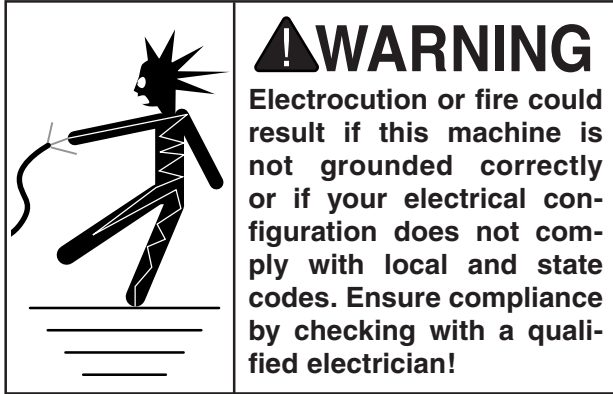


Figure 5. NEMA L15-20 plug and receptacle.



Grounding

In the event of an electrical short, grounding reduces the risk of electric shock. The grounding wire in the power cord must be properly connected to the grounding prong on the plug; likewise, the outlet must be properly installed and grounded.



Extension Cords

We do not recommend the use of extension cords. Instead, arrange the placement of your equipment and the installed wiring to eliminate the need for extension cords.

If you find it absolutely necessary to use an extension cord with your machine, use a 12 gauge cord that must also contain a ground wire and plug pin.

The total length of the power cord from the mill to the power source must not exceed 50 feet in length.

Phase Converter

When using a phase converter, the power from the manufactured power leg (wild wire) can fluctuate.

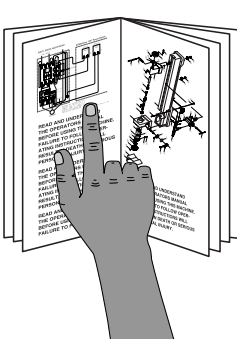
To prevent damage to electrical components, connect the wild wire **ONLY** to the L2 terminal. The wire from the L2 terminal can handle some power fluctuation because it goes directly to the motor. Power from the L1 and L3 terminals go to the transformers and must carry consistent voltage to prevent damage.

Refer to the **ELECTRICAL** section beginning on **Page 66** for more detailed information.



SECTION 3: SETUP

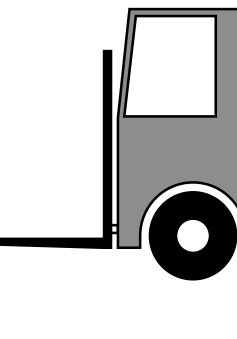
Setup Safety



⚠️ WARNING
 This machine presents serious injury hazards to untrained users. Read through this entire manual to become familiar with the controls and operations before starting the machine!



⚠️ WARNING
 Wear safety glasses during the entire setup process!



⚠️ WARNING
 The Model G0615/G0616 is a heavy machine. Serious personal injury may occur if safe moving methods are not used. To be safe, get assistance and use power equipment to move the shipping crate and remove the machine from the crate.

Items Needed for Setup

The following items are needed to complete the setup process, but are not included with your machine:

Description	Qty
• Flat Head Screwdriver.....	1
• Phillips Screwdriver, short handle	1
• Wrench or Socket 17mm.....	1
• Power Lifting Equipment	As Needed
• Assistance	As Needed
• Safety Glasses	One For Each Person
• Solvent (for cleaning)	As Needed
• Shop Rags (for cleaning)	As Needed
• Mounting Hardware	As Needed

Unpacking

Read and understand all of the instructions contained in this **SETUP** section BEFORE moving the mill from the crate.

The Model G0615/G0616 was carefully packed when it left our warehouse. If you discover the machine is damaged after you have signed for delivery, *please immediately call Customer Service at (570) 546-9663 for advice.*

Save the containers and all packing materials for possible inspection by the carrier or its agent. *Otherwise, filing a freight claim can be difficult.*

When you are completely satisfied with the condition of your shipment, inventory the contents.



Inventory

After all the parts have been removed from the crate and wood boxes, you should have the following items:

Inventory: (Figures 6–8)	Qty
A. Model G0615/G0616 Mill (not shown)	1
B. Wrench 21/24mm	1
C. Large Downfeed Handles.....	3
D. Hex Wrench 5mm	1
E. Keyed Chuck 1–16mm B18	1
F. Square Nut Wrench 21mm.....	1
G. Drift Key.....	1
H. Chuck Key	1
I. Handwheel/Crank Handles.....	4
J. Ram Travel Crank	1
K. Vise Mounting Fasteners	4
L. Rotating Vise	1
M. Horizontal Arbor w/Spacers 1"	1
N. Horizontal Arbor w/Spacers 1¼"	1
O. Drawbars	2
P. Toolbox.....	1
Q. R8 Collets:	
1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2"	1 Ea
9/16", 5/8", 11/16", 3/4", 13/16", 7/8"	1 Ea
R. Adaptor R8 - B18	1
S. Adaptor R8 - MT2.....	1
T. Adaptor R8 - MT3.....	1
U. Way Cover.....	1

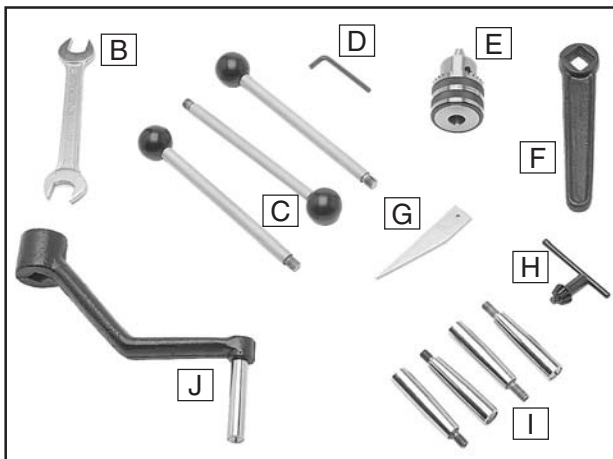


Figure 6. Inventory A–J.

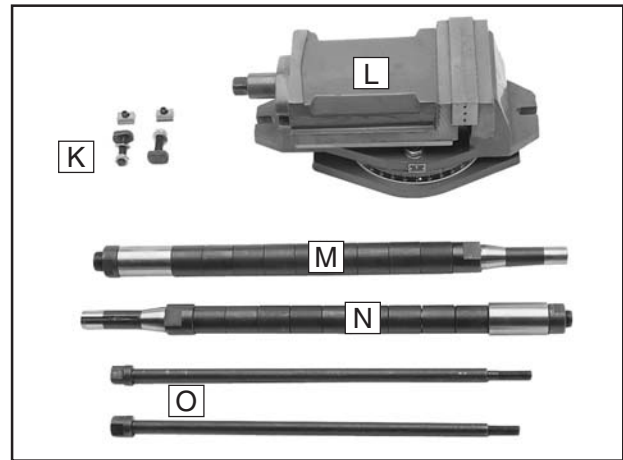


Figure 7. Inventory J–O.

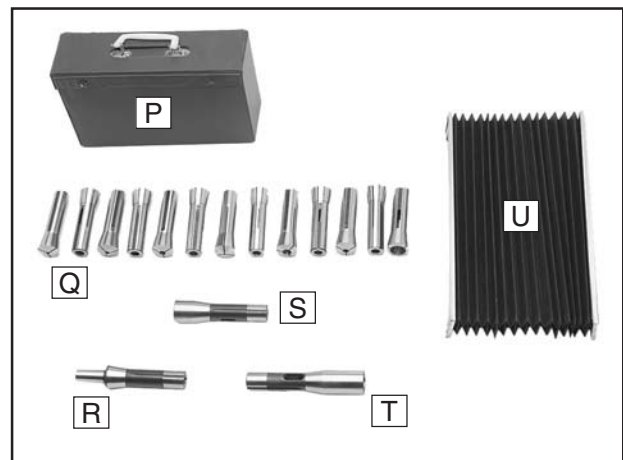


Figure 8. Inventory Q–U.

If any nonproprietary parts are missing (e.g. a nut or a washer), we will gladly replace them; or for the sake of expediency, replacements can be obtained at your local hardware store.

NOTICE

Some hardware/fasteners on the inventory list may arrive pre-installed. Check mounting locations before assuming that any items from the inventory list are missing.



Site Considerations

Floor Load

Refer to the **Machine Data Sheets** starting on **Page 3** for the weight and footprint specifications of your machine. Some floors may require additional reinforcement to support both the machine and operator.

Placement Location

Consider existing and anticipated needs, size of material to be processed through each machine, and space for auxiliary stands, work tables, other machinery, and the operator when establishing a location for your new machine. See **Figures 9–10** for the minimum clearance dimensions.

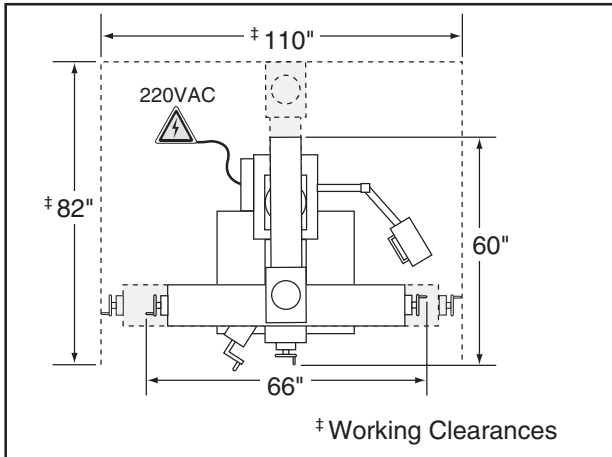


Figure 9. Model G0615 clearance dimensions.

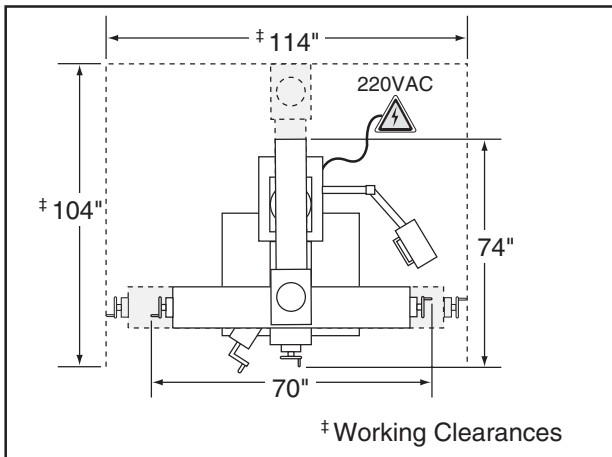


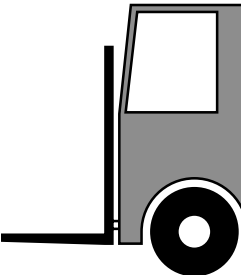
Figure 10. Model G0616 clearance dimensions.

Lighting

Lighting should be bright enough to eliminate shadow in the working zones of the machine and prevent eye strain. Follow local electrical codes for proper installation of new lighting.

	<p>⚠ CAUTION</p> <p>Children and visitors may be seriously injured if unsupervised. Lock all entrances to the shop when you are away. DO NOT allow unsupervised children or visitors in your shop at any time!</p>
--	--

Moving & Placing Base Unit

	<p>⚠ WARNING</p> <p>The Model G0615/G0616 is a heavy machine. Serious personal injury may occur if safe moving methods are not used. To be safe, get assistance and use power equipment to move the shipping crate and remove the machine from the crate.</p>
--	--

When you are ready to move your mill to its permanent position, use a 17mm wrench to remove the mounting bolts holding the mill to the bottom of the crate.



Use power lifting equipment and assistants to move the mill to its permanent position, as shown in **Figure 11**.

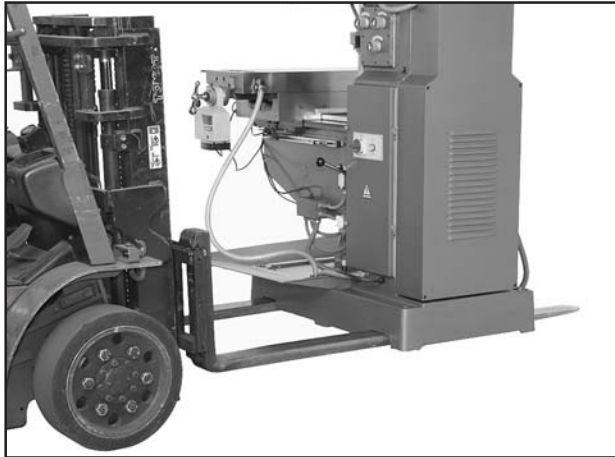


Figure 11. Lift forks positioned under the mill for moving.

⚠️ WARNING

When using power lifting equipment, make sure the equipment is safe, fully operational, and adequately rated for the weight being lifted. The operator of the equipment must be experienced and able to use safe methods during these processes. Failure to heed these warnings could result in serious personal injury or death.

Mounting to Shop Floor

We strongly recommend that you mount your new machine to the floor. Because floor materials may vary, floor mounting hardware is not included.

Anchor studs (**Figure 12**) are a popular method for anchoring your mill to a concrete floor. We suggest you research the many options for mounting your mill and choose one that best fits your specific application.

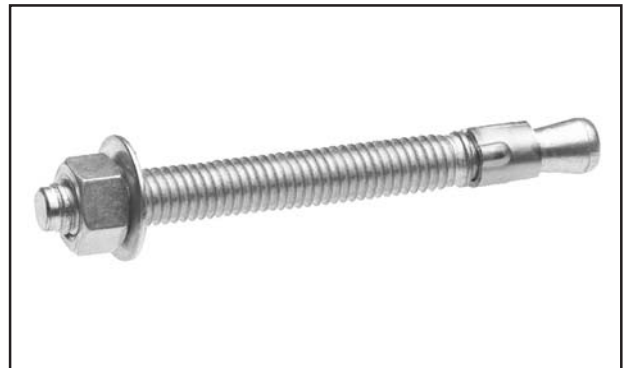


Figure 12. Anchor stud for mounting to concrete floors.

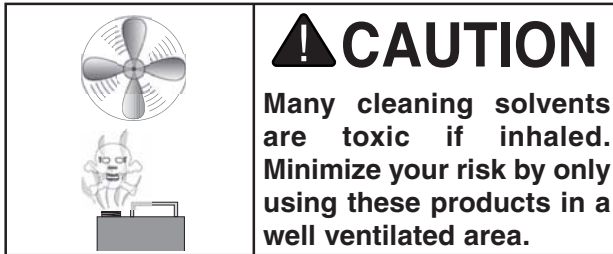
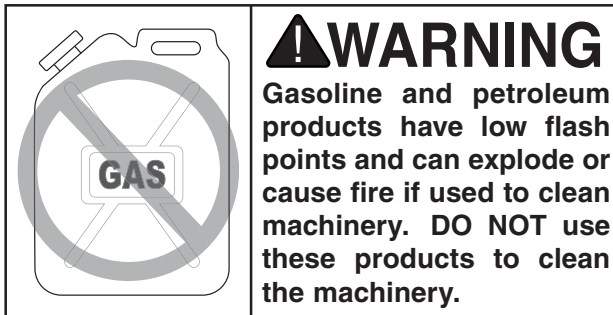
NOTICE

Use shims and a level when mounting your mill to the floor to avoid warping or cracking the cast iron base.



Clean Up

The unpainted surfaces are coated with a waxy oil to prevent corrosion during shipment. Remove this protective coating with a solvent cleaner or citrus-based degreaser such as Grizzly's G7895 Citrus Degreaser. To clean thoroughly, some parts must be removed. **For optimum performance from your machine, clean all moving parts or sliding contact surfaces.** Avoid chlorine-based solvents, such as acetone or brake parts cleaner that may damage painted surfaces. Always follow the manufacturer's instructions when using any type of cleaning product.



G7895—Grizzly Citrus Degreaser

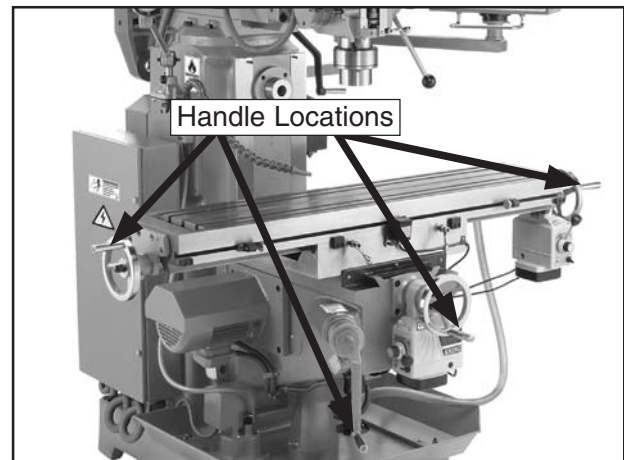
This natural, citrus-based degreaser is a great solution for removing export grease, and it's much safer to work around than nasty solvents.



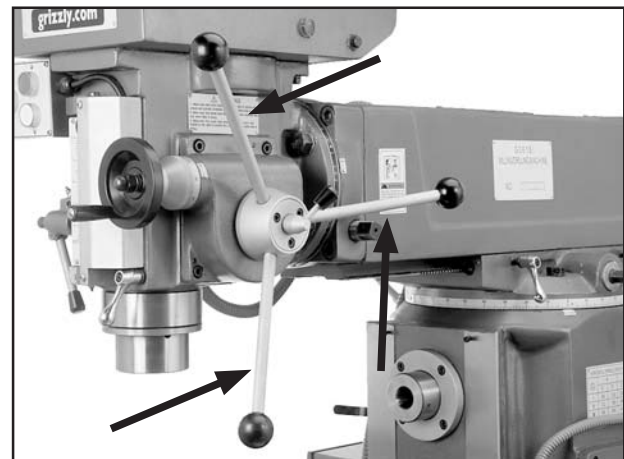
Assembly

To assemble your mill:

1. Use a flat head screwdriver to install and tighten the four handles onto the three handwheels and one crank, as shown in **Figure 14**.



2. Thread and tighten the large downfeed handles into the downfeed hub, as shown in **Figure 15**.



Way Cover Installation

1. Use the four screws from the way cover mounting location to install the way cover to the rear of the saddle (see **Figure 16**).

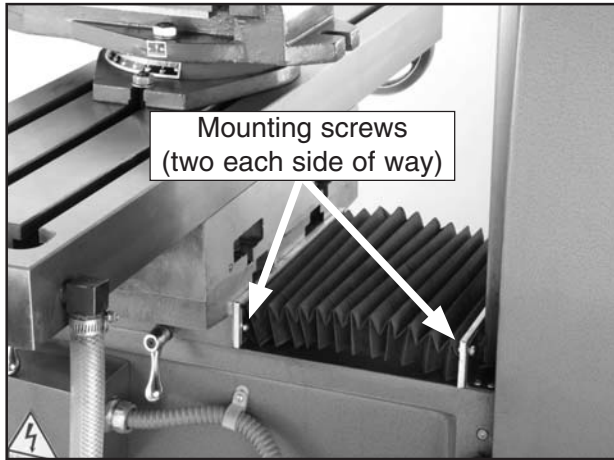


Figure 16. Way cover installed.

Test Run

Once the assembly is complete, you must test run your mill to make sure it operates properly.

If, during the test run, you cannot easily locate the source of an unusual noise, vibration, or unexpected action, stop using the machine immediately, then review the **Troubleshooting** on **Page 53**.

If you still cannot remedy a problem, contact our Tech Support at (570) 546-9663 for assistance.

To prepare your mill for the test run:

1. Read and understand the safety instructions beginning on **Page 13**.
2. Thoroughly read and understand all of the **OPERATION** instructions beginning on **Page 28**.
3. Confirm there is an adequate level of oil in the headstock gearbox (see **Gearbox Oil** on **Page 51** for detailed instructions).
4. Perform the lubrication procedures as described in the **Lubrication** subsection on **Page 44**.
5. Fill the coolant reservoir with coolant (see **Coolant Maintenance** on **Page 51** for detailed instructions).
6. Make sure all tools and objects used during setup are cleared away from the machine.
7. Review **Circuit Requirements** on **Page 17** and connect the machine to the power source.

Continued on next page →



During the following steps of the test run, listen to and watch for abnormal noises or actions. The machine should run smoothly with little or no vibration or rubbing noises.

As you proceed, refer to **Figures 17–18** and the following descriptions for the location of buttons and switches on the control panel.

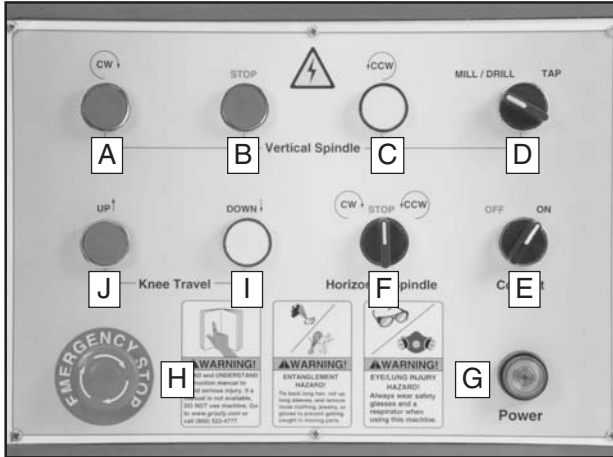


Figure 17. Model G0615/G0616 Control panel.

Control panel button and switch descriptions (Figure 17):

- A. Vertical Spindle Clockwise
- B. Vertical Spindle Stop
- C. Vertical Spindle Counterclockwise
- D. Vertical Spindle Mode Selector
- E. Coolant Pump
- F. Horizontal Spindle
- G. Power Button & Lamp
- H. EMERGENCY STOP
- I. Knee Down Travel
- J. Knee Up Travel



Figure 18. Main power switch in the **OFF** position (Model G0615 shown).

To test the general operation of your mill:

1. Turn the main power switch **ON**—the switch should be horizontal.
2. Turn the horizontal spindle switch on the control panel to the STOP position.
3. Press in the control panel POWER button—the green lamp should be lit.
4. Turn the horizontal spindle switch on the control panel to the CW position and confirm the horizontal spindle is turning clockwise.

Note: Keep your hand poised over the EMERGENCY STOP button in case you need to shut down all power immediately.

NOTICE

To ensure that the safety features and general operations of your mill work properly, it is important that the motors are spinning in the correct direction. If this is NOT the case as evidenced by Step 2 above, disconnect the mill from power and switch any two incoming "hot" power source terminations. If you are not sure how to complete this task, ask your electrician for assistance.

5. Turn the horizontal spindle switch on the control panel to the CCW position and confirm the horizontal spindle is turning counterclockwise; then, turn the switch to the STOP position.
6. Flip the vertical spindle mode switch (top right of the control panel) to the MILL/DRILL position.
7. Press the vertical spindle CW button and confirm the vertical spindle is turning clockwise.

Note: "Clockwise" or "counterclockwise" as used in reference to the direction of the vertical spindle would be as viewed downward from the top of the headstock.



8. Press the vertical spindle STOP button and wait for the vertical spindle to come to a complete stop.
9. Press the vertical spindle CCW button and confirm the vertical spindle is turning counter-clockwise; then, turn the vertical spindle **OFF** by pressing the center vertical spindle STOP button.
10. Repeat **Steps 6–9** using the vertical spindle controls mounted on the left side of the headstock.
11. When the vertical spindle has stopped, flip the vertical spindle mode switch to the Tap position.

Note: *Make sure the table is lowered enough so that the vertical spindle will not hit it as the spindle lowers during the following steps.*

12. Press the vertical spindle CW button to turn the vertical spindle **ON** (the CCW button will not respond in tapping mode).

—The vertical spindle should travel down until the auto-downfeed lower stop engages the lower reverse switch; then the vertical spindle should reverse direction and travel up.

Note: *Refer to **Page 38** for detailed instruction on using the auto-downfeed depth stop mechanism.*

—When the quill position ring engages the upper reverse switch, the vertical spindle should once again reverse direction and travel down.

13. Stop the vertical spindle before continuing.
14. Use the coolant switch on the control panel to turn the coolant pump **ON** and check for coolant flow from the coolant nozzle by adjusting the valve lever at the base of the nozzle hose.

To test the power ON/OFF features of your mill:

1. Make sure the main power switch is turned to **OFF**—the switch should point straight up.
2. Press the EMERGENCY STOP button in, then turn it clockwise until it pops out to allow the power to flow to the control panel and motors.
3. With the horizontal spindle switch on the control panel pointing to the STOP position, press in the POWER button—nothing should happen and the green power light should not be lit.
4. Using the control panel, press the vertical spindle CW button—the vertical spindle should not move.
5. Press the EMERGENCY STOP button in and make sure that it stays in.
6. Turn the main power switch to **ON**—the switch should be horizontal.
7. Repeat **Steps 3–4** above—you should experience the same results.
8. Twist the EMERGENCY STOP button clockwise until it pops out.
9. Press the power button—the green light should now be lit.

—If the above steps are successful, you have confirmed the power ON/OFF features of the mill work as designed.

—If any of the above steps fail, stop using the machine immediately, disconnect the mill from power; then review the **Troubleshooting** on **Page 53**. If you still cannot remedy a problem, contact our Tech Support at (570) 546-9663 for assistance.



The Model G0615/G0616 comes with power feeds for X, Y, and Z-axis table travel. The limit switches for these table travel directions are an important part of the safe operation for your mill.

To test the table travel limit power feeds and switches:

1. Make sure all tools, cables, and other items are well clear of table movement as you follow these steps.
2. Refer to **Table Movement** on **Page 35** to understand how the power feeds and limit switches function.

IMPORTANT: *Keep your hand near the EMERGENCY STOP button during each of the following steps in case you need to shut down all power and table movement immediately.*

3. Make sure the control panel power light is **ON**.
4. Loosen the two X-axis table lock handles on the front side of the table.
5. On the X-axis power feed to the right of the table, make sure the directional lever is in the center position (neutral) and turn the speed dial to "2"—the "2" will be top center.
6. Flip the power feed power switch up (ON) and move the directional lever to the left to start the table movement.
7. Confirm the table is moving to the left and watch for the table limit stop to hit the limit switch, which should stop the table movement.
8. Move the directional lever on the power feed through the center position and all the way to the right—this should start the table moving to the right.
9. Confirm the table stops moving as the right table limit stop engages the limit switch, then move the power feed directional lever to the center position and flip the power switch down (OFF).

10. Repeat **Steps 5–10** for the Y-axis (cross) table movement in a similar manner.
11. Move the Z-axis locking lever on the right side of the knee all the way down.
12. Z-axis table travel is controlled by the UP and DOWN buttons on the control panel. Use these controls to test Z-axis table travel and confirm that movement stops when the limit switches are engaged.

Spindle Break-In

NOTICE

Failure to follow spindle break-in procedures will likely cause rapid deterioration of spindle components.

It is essential to closely follow the proper break-in procedures to ensure trouble-free performance of your mill. Complete this process once you have familiarized yourself with all instructions in this manual.

To perform the spindle break-in procedure:

1. Successfully perform all the steps in the **Test Run** subsection beginning on **Page 24**.
2. Make sure both spindles are **OFF**, and set the horizontal RPM to the lowest setting (see **Setting RPM** on **Page 28** for detailed instructions).
3. Turn the horizontal spindle **ON**, and let it run for a minimum of 10 minutes in the clockwise direction and another 10 minutes in the counterclockwise direction.
4. Repeat **Step 3** for each of the horizontal RPM settings.
5. Repeat **Steps 2–4** for the vertical spindle.
6. Change the headstock gearbox oil (see **Gearbox Oil** on **Page 51** for detailed instructions).

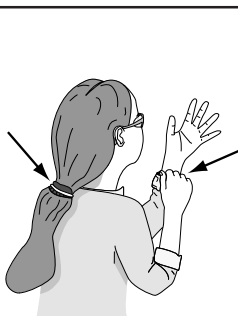
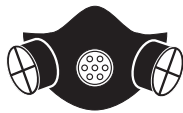


SECTION 4: OPERATIONS

Operation Safety

⚠️ WARNING

Damage to your eyes and lungs could result from using this machine without proper protective gear. Always wear safety glasses and a respirator when operating this machine.



⚠️ WARNING

Loose hair and clothing could get caught in machinery and cause serious personal injury. Keep loose clothing and long hair away from moving machinery.

NOTICE

If you have never used this type of mill before, WE STRONGLY RECOMMEND that you read books, trade magazines, or get formal training before beginning any projects. Regardless of the content in this section, Grizzly Industrial will not be held liable for accidents caused by lack of training.

Setting RPM

To select the proper RPM for either the vertical or horizontal spindle, you will need to: 1) determine the RPM needed to cut your workpiece, and 2) configure the speed controls for the spindle you will use for the operation.

NOTICE

Always turn the spindle **OFF** and allow the it to come to a complete stop before changing gear configurations to avoid damaging drive gears and bearings.

To determine the RPM needed for your workpiece:

1. Use the table in **Figure 19** to determine the cutting speed required for the material of your workpiece.

Cutting Speeds for High Speed Steel (HSS) Cutting Tools

Workpiece Material	Cutting Speed (sfm)
Aluminum & alloys	300
Brass & Bronze	150
Copper	100
Cast Iron, soft	80
Cast Iron, hard	50
Mild Steel	90
Cast Steel	80
Alloy Steel, hard	40
Tool Steel	50
Stainless Steel	60
Titanium	50
Plastics	300-800
Wood	300-500

Note: For carbide cutting tools, double the cutting speed. These values are a guideline only. Refer to the MACHINERY'S HANDBOOK for more detailed information.

Figure 19. Cutting speed table for HSS cutting tools.



2. Measure the diameter of your cutting tool in inches.
3. Use the following formula to determine the required RPM for your operation:

$$(\text{Cutting Speed} \times 4) / \text{Tool Diameter} = \text{RPM}$$

To configure the speed controls for the vertical spindle:

1. Examine the vertical spindle speed chart to find the closest match to your required RPM (see **Figure 20** or the chart on the left side of the headstock).

	A		B	
	I	II	I	II
L	108	192	312	552
H	468	828	1356	2400

Figure 20. Vertical spindle speed chart.

2. Make sure the power is **OFF** and both spindles are at a complete stop before proceeding to avoid damaging the drive gears or bearings.
3. Refer to the vertical spindle speed chart to configure the vertical spindle speed controls for your required RPM.

Note: You may have to rotate the spindle by hand to aid in the gear change.

Example: To set the vertical spindle RPM to 1356 RPM: 1) move the top left lever to "B", 2) move the bottom left lever to "I", and 3) move the right lever to "H" (see **Figure 21**).

Note: Leaving any lever in the "0" position will put the gear train in neutral and the vertical spindle will not move when power is applied.

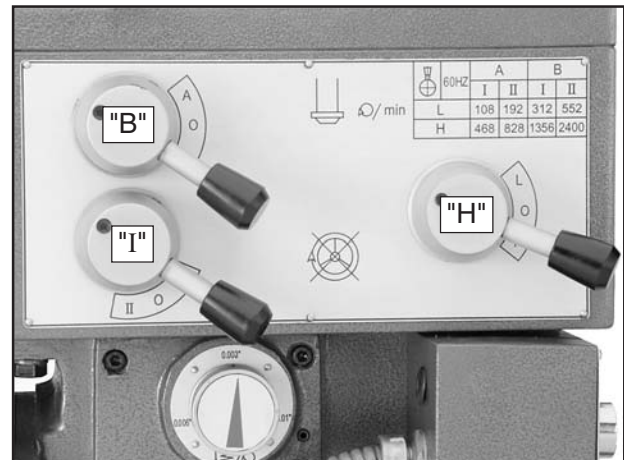


Figure 21. Vertical spindle speed controls set to 1356 RPM.



To configure the speed controls for the horizontal spindle:

1. Identify your required RPM on the horizontal speed chart for your operation (see **Figure 22** or the chart on the right side of the column).

	A		B	
	C	D	C	D
I	48	132	324	816
II	72	180	456	1140
III	96	240	612	1560

Figure 22. Horizontal speed chart.

2. Make sure the power is **OFF** and both spindles are completely stopped before proceeding to avoid damaging the drive gears or bearings.
3. Configure the horizontal spindle speed controls as indicated in the horizontal spindle speed chart for your RPM.

Note: You may have to rotate the spindle by hand to aid in the gear change.

Example: To set the horizontal spindle RPM to 456 RPM 1) move the top left knob to "B", 2) move the top right knob to "C", and 3) move the bottom knob to "II" (see **Figure 23**).

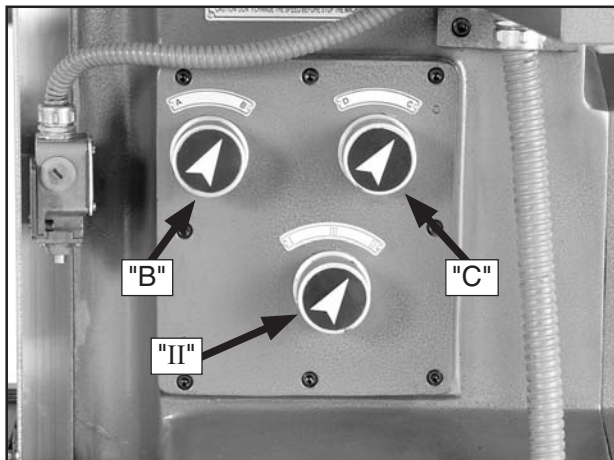


Figure 23. Horizontal spindle speed controls configured for 456 RPM.

Loading and Unloading Tools

To load a tool holder into the vertical spindle:

1. DISCONNECT THE MILL FROM POWER!
2. Clean any debris from the spindle opening and the mating surface of the tool holder.
3. Tighten the quill locking lever to secure the vertical quill in place.
4. Remove the drawbar cap from the top of the headstock (see **Figure 24**).

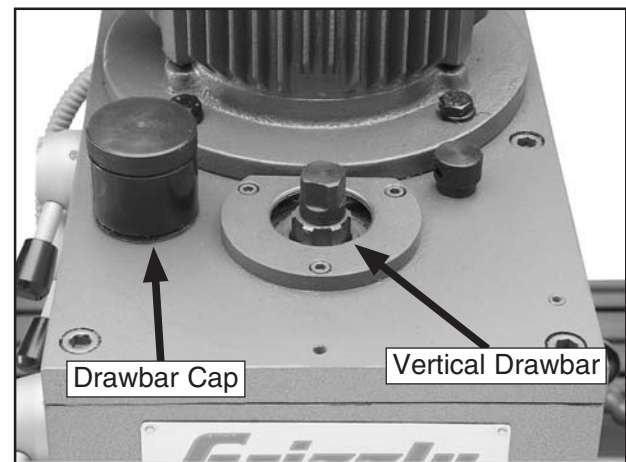


Figure 24. Vertical spindle drawbar.

5. As you insert the tool holder into the bottom of the vertical spindle, rotate it until the tool holder keyway aligns with the internal key of the spindle. Then push the tool holder upward to fully seat it.

Note: The vertical drawbar is the shorter of the two drawbars included with your mill.



6. While supporting the tool holder, thread the vertical drawbar into the tool holder, then tighten it with the square nut wrench provided or a 21mm wrench.

Note: Only tighten the drawbar until it is snug. Overtightening the drawbar could make removing the tool holder very difficult.

7. Replace the drawbar cap, and clear all tools away from table and cutting tool before turning the power and spindle **ON**.

To unload a tool holder from the vertical spindle:

1. DISCONNECT THE MILL FROM POWER!
2. Return the vertical quill to its highest position.
3. Clean any debris or chips away from cutting tool and tool holder.
4. Lock the vertical quill in place and remove the drawbar cap.
5. Keep one hand on the tool holder and use a wrench to completely unthread the vertical drawbar.

Note: If the tool holder does not immediately release from the spindle when the drawbar is loosened one or two threads, you may need to strike the top of the drawbar with a dead blow or rubber mallet.

6. Clean any debris from the spindle opening and replace the drawbar cap.

To load an arbor into the horizontal spindle:

1. DISCONNECT THE MILL FROM POWER!
2. Rotate the ram and headstock 180° counter-clockwise so that the horizontal arbor support is in-line with the horizontal spindle (see **Vertical Spindle Head and Ram Movement** on **Page 34** for detailed instructions).

Note: Make sure the "0" on the ram rotation graduated dial is matched with the alignment mark on the column.

3. Extend the ram so that the horizontal arbor support is all the way forward (see **Figure 25**).

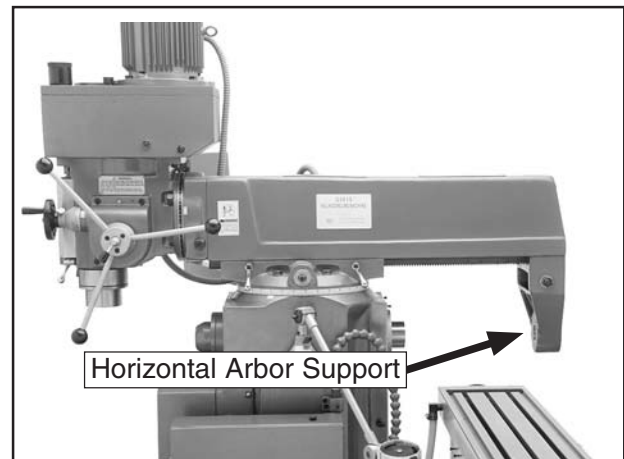


Figure 25. Ram and headstock rotated 180° to allow use of horizontal spindle.



4. Place a piece of plywood on the mill table to protect the surface.
5. Loosen the hex nut on the left side of the horizontal arbor support and remove it from the ram dovetail way (see **Figure 26**).

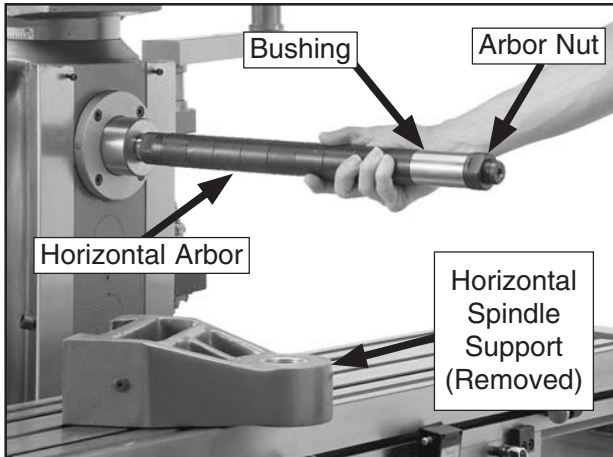


Figure 26. Horizontal arbor support removed and arbor inserted into horizontal spindle.

6. Clean any debris from the spindle opening and the mating surface of the arbor.
7. As you insert the arbor into the horizontal spindle, rotate it until the arbor keyway aligns with the spindle internal key.

Note: Get another person to help you support the arbor until it can be secured into the horizontal arbor support.

8. Insert the horizontal drawbar into the horizontal spindle from the rear of the column (see **Figure 27**).

Note: The horizontal drawbar is the longer of the two drawbars included with your mill.

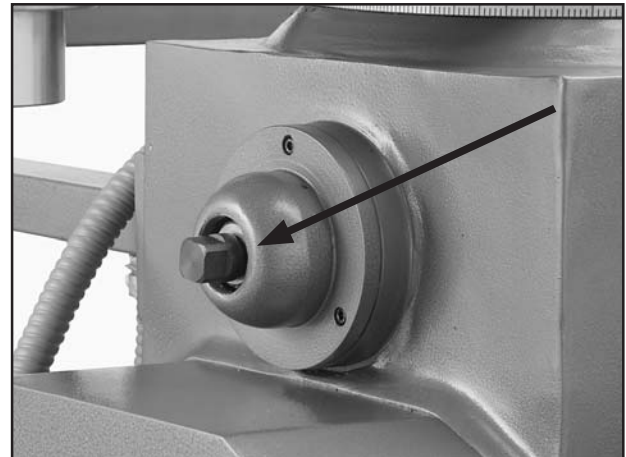


Figure 27. Drawbar inserted into horizontal spindle from rear of the column.

9. Thread the horizontal drawbar into the arbor and tighten with the square nut wrench provided or a 21mm wrench.

Note: Only tighten the drawbar until it is snug. Overtightening the drawbar could make removing the arbor very difficult.

10. While still maintaining support for the arbor, install your cutting tools onto the arbor.

Note: Use the spacers in such a way that the bushing on the outbound end of the arbor ends up at the very end of the arbor with just enough room for the arbor nut.



11. Lubricate the arbor bushing with a thin coat of light oil.
12. With the arbor nut removed, slide the horizontal arbor support onto the ram dovetail way and, at the same time, insert the arbor bushing into the brass housing of the arbor support (see **Figure 28**).

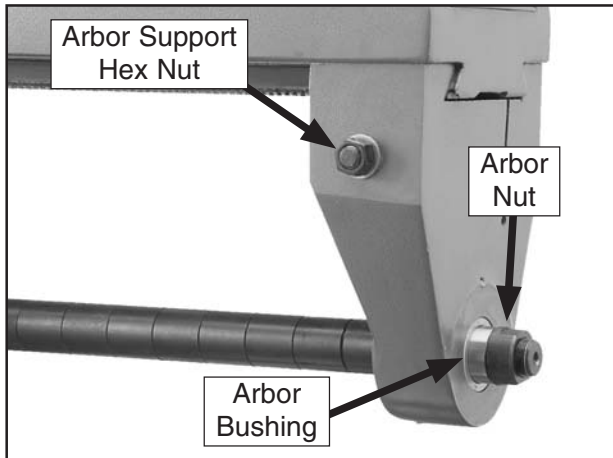


Figure 28. Horizontal arbor installed.

13. Position the horizontal arbor support along the ram dovetail way, so that the arbor bushing is visible on both sides of the arbor support, then tighten the arbor support hex nut.
14. Thread the arbor nut onto the arbor and tighten it until snug.

Note: After the arbor nut has been tightened, make sure the arbor bushing is still showing on both sides of the arbor support. If it is out of position, re-position the arbor support.

To unload an arbor from the horizontal spindle:

1. DISCONNECT THE MILL FROM POWER!
2. Remove the arbor nut from the end of the arbor.
3. Place a piece of plywood on the mill table to protect the surface.
4. Clean any debris or chips away from the arbor and cutting tool(s).
5. Have an assistant fully support the arbor, then loosen the hex nut on the side of the horizontal arbor support and remove the arbor support from the ram dovetail way.
6. Loosen the horizontal drawbar with the square nut wrench provided or a 21mm wrench.

Note: If the arbor does not immediately release from the spindle when the drawbar is loosened one or two threads, you may need to strike the drawbar with a dead blow or rubber mallet.

⚠ WARNING

Always remove the horizontal drawbar when it is not being used. Otherwise, it could eject from the horizontal spindle at a high speed causing property damage or serious personal injury.

7. After the arbor is removed, replace the horizontal arbor support and tighten the hex nut to keep it in place at the end of the ram dovetail way.
8. Clean any debris from the horizontal spindle opening.



Vertical Spindle Head and Ram Movement

The vertical spindle head can be positioned along any combination of three axis paths, as illustrated in **Figure 29**.

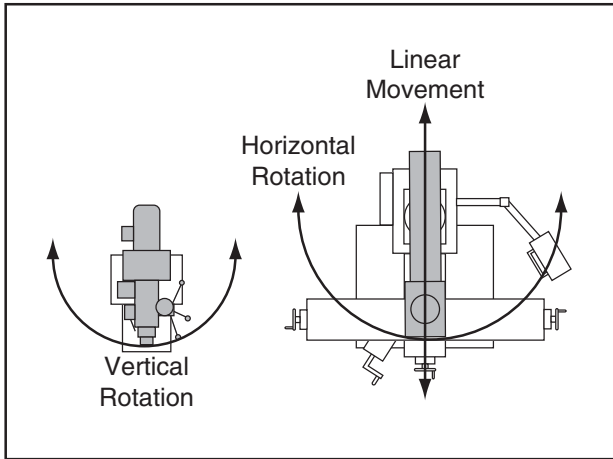


Figure 29. Vertical spindle head movement.

To rotate the vertical spindle head vertically:

1. DISCONNECT THE MILL FROM POWER!
2. Use a 24mm wrench to loosen the four vertical spindle mounting hex nuts $\frac{1}{2}$ turn—there are two hex nuts on either side of the head (see **Figure 30**).

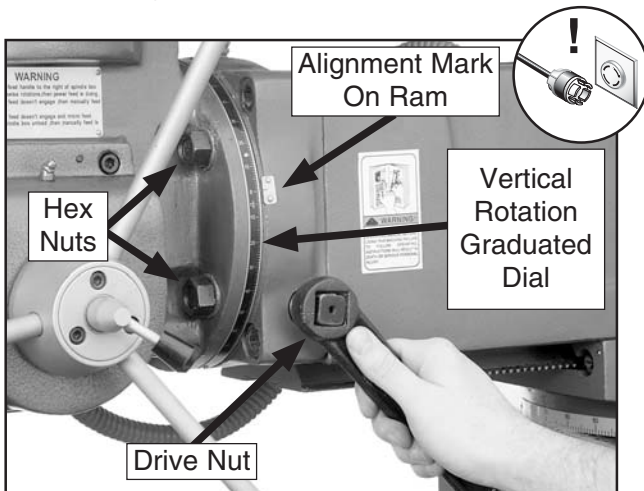


Figure 30. Rotating vertical spindle head vertically.

3. To rotate the headstock, use the square nut wrench provided to turn the square drive nut shown in **Figure 30**.

Note: Reference the vertical rotation graduated dial and ram alignment mark to position the headstock for your operation.

4. Re-tighten the four vertical spindle mounting hex nuts before beginning milling operation.

To rotate the vertical spindle head horizontally:

1. DISCONNECT THE MILL FROM POWER!
2. Use a 22mm wrench to loosen the four ram mounting hex nuts $\frac{1}{2}$ turn—there are two hex nuts on either side of the ram (see **Figure 31**).

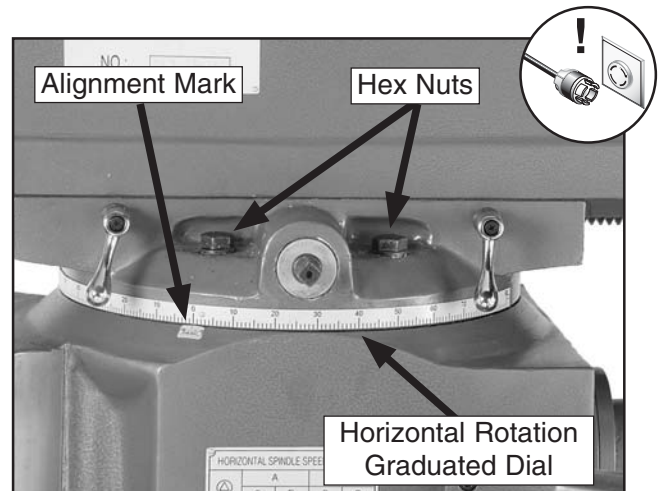


Figure 31. Rotating the vertical spindle head and ram horizontally.

3. Using the horizontal rotation graduated dial and the alignment mark on the column, move the vertical spindle head to the required position for your operation.

NOTICE

When rotating the ram 180° to use the horizontal spindle, rotate the ram in a counterclockwise direction and take care not to tangle or pinch cables, hoses, or hit the control panel with the spindle head.

4. Re-tighten the four ram mounting hex nuts before turning the power and spindle **ON**.



To move the ram along a linear path:

1. DISCONNECT THE MILL FROM POWER!
2. Loosen the ram locking levers on the side of the ram (see **Figure 32**).

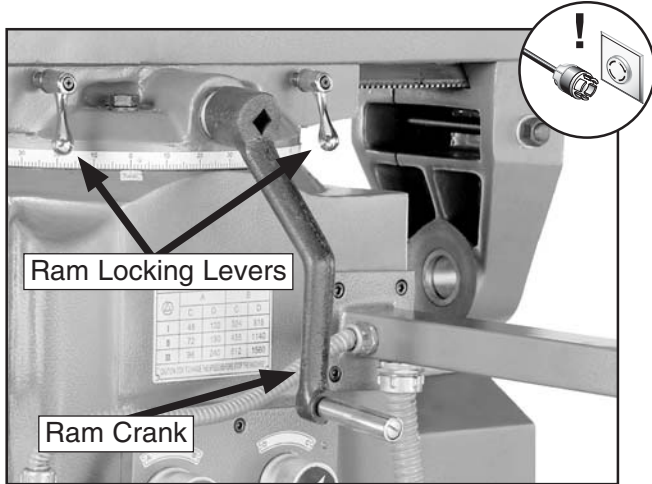


Figure 32. Moving the ram along a linear path.

3. Use the ram crank provided to move the vertical spindle head and ram to the required position for your operation, then re-tighten the ram locking levers.

Table Movement

Your mill is equipped with power feeds for all three axis table travel paths: X, Y, and Z-axis (see **Figure 33**).

The controls for the Z-axis power feed differ from those of the X and Y-axis.

CAUTION

Stay clear of manual handwheels and cranks when using power feeds to avoid entanglement and serious personal injury.

Note: Feed rates for table travel are extremely difficult to precisely calculate. We recommend that you combine research and experimentation to find the feed rates that best work for your operations.

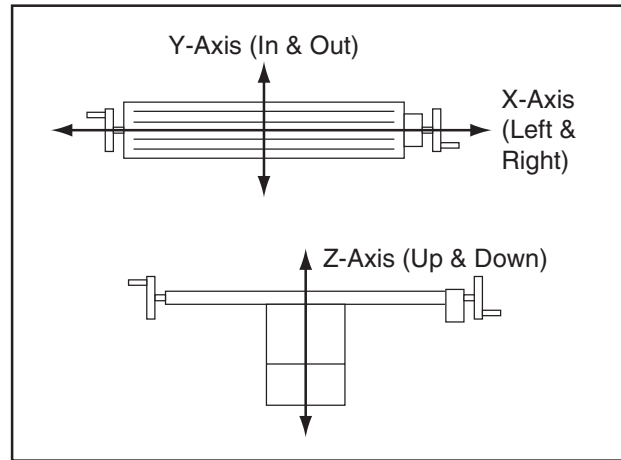


Figure 33. The three axis paths of the mill table travel.

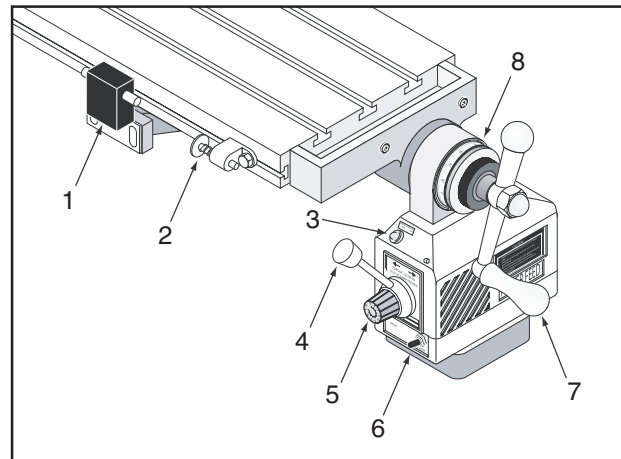


Figure 34. X-axis and Y-axis power feed systems.

X and Y-Axis Power Feeds

The X-axis and Y-axis use the same power feed systems. Refer to **Figure 34** as you familiarize yourself with the components of these systems and their descriptions listed below.

1. **Limit Switch.** Powered table movement will stop when either of the side plungers are depressed by the limit stops.
2. **Limit Stop.** Locate the limit stops along the table (one on either end of the table) to depress the limit switch plunger to stop the table at the desired position.



3. **Rapid Traverse Button.** Once the directional lever has been activated, pushing this button will cause the power feed to move the table at full speed.
4. **Directional Lever.** Moving this lever to one side or the other will move the table in that direction. The center position is neutral.
5. **Speed Dial.** Controls the speed that the table moves—turning the dial clockwise causes the table to move faster.
6. **ON/OFF Switch.** This is the master power switch for the power feed.
7. **Handwheel.** Use this handwheel to manually position the table.
8. **Travel Graduated Dial.** Marked in 0.001" increments, each complete revolution is equal to 0.2" of table travel.

To operate the X-axis or Y-axis power feeds:

1. Loosen the table locking levers (see **Figures 35–36**).

NOTICE

To avoid serious damage to the mill, always keep limit stops installed in the proper position to correctly engage the limit switches during operation.

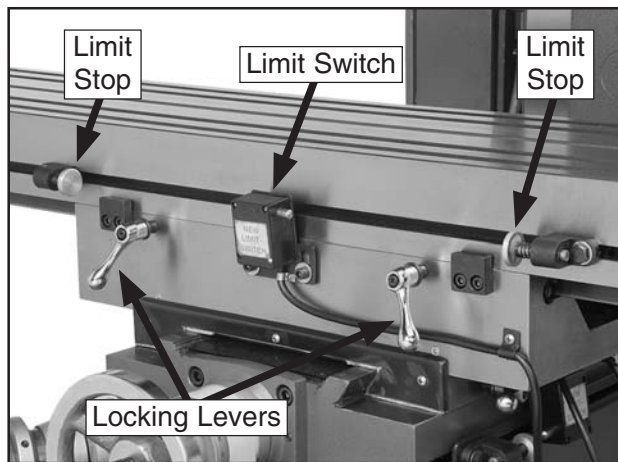


Figure 35. X-axis limit switch, limit stops, and locking levers (front of Model G0615 shown).

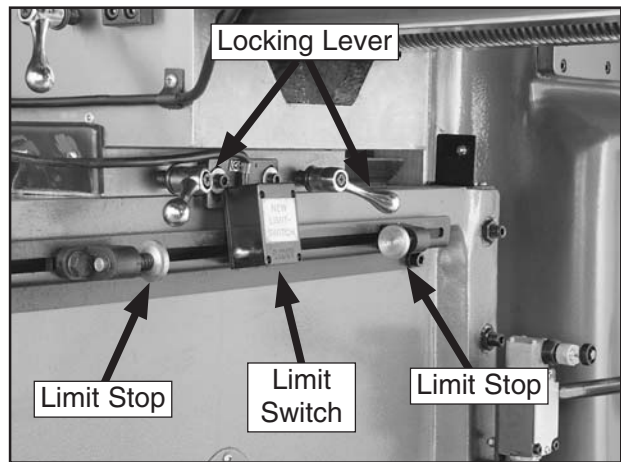


Figure 36. Y-axis limit switch, limit stops, and table locking levers (right side of Model G0615 shown).

2. Using a 14mm wrench, position the limit stops along the table to limit the distance you want the table to travel.

Note: When either limit stop depresses the plunger on the limit switch, powered table movement in that direction will stop.

⚠ CAUTION

Before running your power feed, be sure there is enough running clearance between the table, spindle, vise/clamps or jigs. Be aware that all of these objects represent potential pinch points.

3. To idle the power feed in neutral, move the directional lever to the center position.
4. Flip the ON/OFF switch up to turn the power **ON**.
5. Adjust the speed dial to move the table at the required feed rate for your operation.
6. Move the directional lever in the direction you want the table to move.
7. When you are finished using the power feed, leave the directional lever in the center or neutral position and flip the ON/OFF switch down to turn the power feed **OFF**.



Z-Axis Table Movement

The Z-axis limit switches, limit stops, and locking lever are found on the sides of the knee. Refer to **Figures 37–40** and descriptions below to become familiar with these Z-axis components.

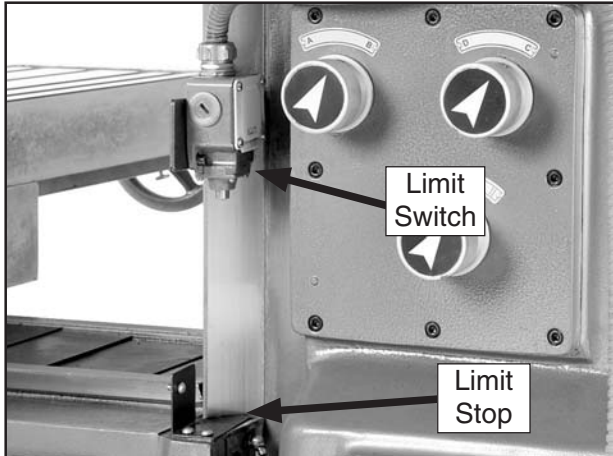


Figure 37. Z-axis upper limit switch and limit stop (right side of Model G0615 shown).

Note: The locations of the Z-axis limit switches and limit stops are designed to protect the knee and mill components while allowing full range of table travel. However, while the lower limit stop is adjustable, the upper limit stop is not.

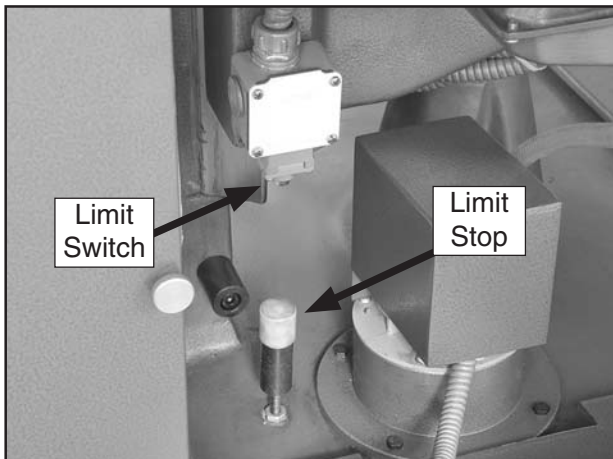


Figure 38. Z-axis lower limit switch and limit stop (left side of Model G0615 shown).

The Z-axis locking lever (see **Figure 39**) works together with its own safety switch.

- Move the locking lever UP to its highest point to lock the knee into position. In this position, the safety switch plunger is depressed and further powered Z-axis table movement is disabled.
- Move the locking lever DOWN to its lowest point to unlock the knee and disengage the safety switch plunger, which will enable powered Z-axis table movement.

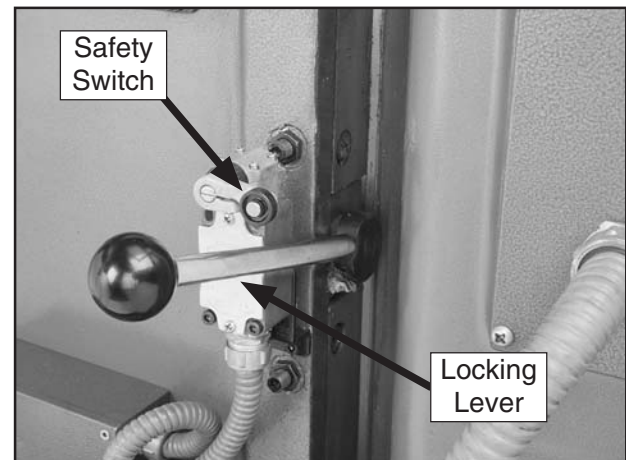


Figure 39. Z-axis locking lever and safety switch (right side of Model G0615 column shown).

The up and down power controls for Z-axis table travel are located on the control panel (see **Figure 40**).

Note: When these buttons are released, Z-axis table movement will stop.



Figure 40. Z-axis (knee) power feed controls.



!WARNING

Never leave the mill unattended whenever the power to the mill is enabled or any part of the mill is in motion. Always be ready to use the **EMERGENCY STOP** button during any operation in case of an unexpected action. Failure to heed this warning could result in serious personal injury or death.

The manual crank for Z-axis table travel is located left and below the table (see **Figure 41**).

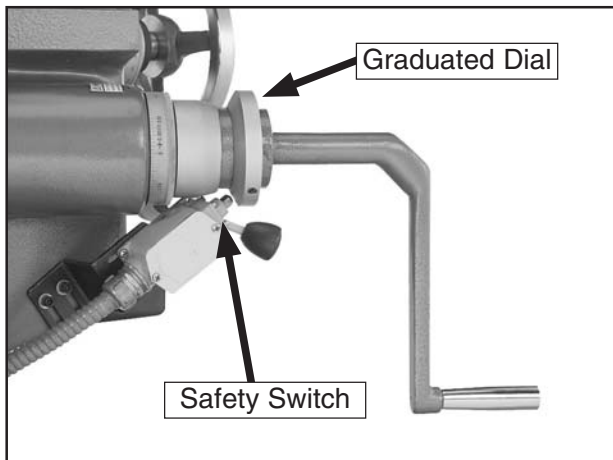


Figure 41. Z-axis crank and safety switch.

The Z-axis graduated dial is marked in 0.001" increments and the knee will move 0.01" with each revolution of the dial.

When the Z-axis crank is pressed in and engaged, the safety switch will disable powered Z-axis movement.

Downfeed Controls

The Model G0615/G0616 mill features three modes of vertical spindle downfeed operation: large downfeed, fine downfeed, and auto-downfeed.

To use the large downfeed control:

1. Loosen the quill locking lever and the downfeed clutch lever (see **Figure 42**).

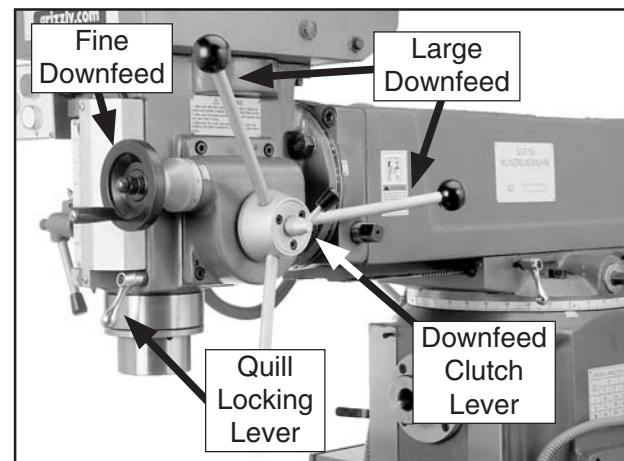


Figure 42. Large downfeed and fine downfeed controls.

2. Use the large downfeed handles to lower and raise the vertical spindle.

Note: *Although the vertical spindle has a spring return that will automatically raise the spindle to its uppermost position, we recommend that you keep your hand on the large downfeed handles to raise the vertical spindle in a controlled manner.*

3. Use the quill locking lever to lock the quill and spindle in place if required for your operation.

NOTICE

Always loosen the quill locking lever before using the downfeed controls to avoid premature wear of quill locking assembly and scoring of the quill.



To use the fine downfeed control:

1. Loosen the quill locking lever (see **Figure 42**).
2. Tighten the downfeed clutch lever.
3. Use the fine downfeed handwheel to lower and raise the vertical spindle.

Note: *The fine downfeed graduated dial is marked in 0.001" increments and each full revolution of the fine downfeed handwheel moves the vertical spindle 0.08".*

The auto-downfeed control can be used in either mill/drill mode or tapping mode (refer to **Tapping on Page 40** for additional information on tapping mode).

The auto-downfeed scale and depth stop are used to limit the downward travel of the vertical spindle by releasing the auto-downfeed lever in mill/drill mode, or engaging the lower spindle reverse switch in tapping mode.

Use **Figure 43** and the descriptions below to become familiar with the auto-downfeed controls and operation.

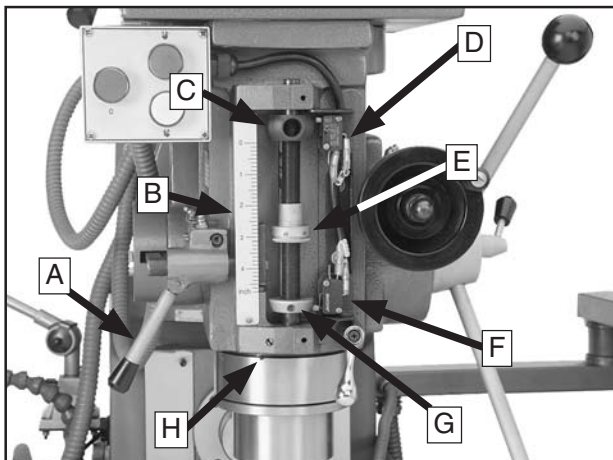


Figure 43. Auto-downfeed controls (safety plate removed for identification clarity).

A. Auto-Downfeed Lever. When positioned to the left, this lever engages the auto-downfeed gears.

B. Auto-Downfeed Scale. A relative scale in inches to be used with the adjustable stop for controlling the downward travel of the vertical spindle.

C. Quill Position Ring. This ring is attached to the quill and provides positive positioning of the quill to the adjustable depth stop and to the upper reverse switch.

D. Upper Reverse Switch. When the mill is in tapping mode, the quill position ring will activate this switch as it rises to the top, which will reverse the spindle rotation to clockwise and the spindle travel direction to down.

E. Adjustable Depth Stop. This rotating depth stop is marked in 0.001" increments and one complete revolution on the threaded rod will equate to 0.06" difference in spindle travel. The quill position ring will mate with this stop to move the threaded rod and the lower stop. Use this depth stop with the relative auto-downfeed scale to control the downward spindle travel for your operation.

F. Lower Reverse Switch. Acts in the same manner as the upper reverse switch, but will change the vertical spindle rotation to counterclockwise and the spindle travel to up.

G. Lower Stop. The purpose of the lower stop differs for each of the mill modes:

—In the mill/drill mode, the lower stop activates the auto-downfeed lever release.

—In the tapping mode, the lower stop activates the lower reverse switch.

H. Auto-Downfeed Lever Release. When activated, this mechanical switch will force the auto-downfeed lever to release. This action stops the spindle and allows it to return upward.



To use the auto-downfeed in mill/drill mode:

1. Turn the vertical spindle **OFF** and allow the spindle to come to a complete stop.
2. Loosen the quill locking lever and the downfeed clutch lever on the large downfeed hub.
3. Move the vertical spindle mode selector to Mill/Drill.

Note: When the mill is in tapping mode, the vertical spindle can only be activated with the clockwise button.

4. Position the auto-downfeed adjustable depth stop to control the downward spindle travel that is right for your operation.
5. Move the auto-downfeed lever to the left to engage the auto-downfeed gears.
6. Start the vertical spindle in a clockwise rotation.

Note: The vertical spindle has a spring return that automatically raises the spindle to its uppermost position when this operation is complete. However, we recommend that you keep your hand on the large downfeed handles to raise the vertical spindle in a controlled manner to avoid undue wear on the quill and gears.

Tapping

To use the tapping feature on your mill:

1. Read and understand the **Downfeed Controls** subsection on **Page 38**.
2. Turn the vertical spindle **OFF** and allow the spindle to come to a complete stop.
3. Loosen the quill locking lever and the downfeed clutch lever on the large downfeed hub.
4. Switch the vertical spindle mode selector to Tap.

5. Position the auto-downfeed adjustable depth stop to control the downward spindle travel that is right for your tapping operation.
6. Move the auto-downfeed lever to the left to engage the auto-downfeed gears.
7. Start the vertical spindle in a clockwise rotation.

Note: When the auto-downfeed lower stop engages the lower reversing switch, the spindle will automatically reverse direction and travel upward. When the quill position ring engages the upper reversing switch, the spindle rotation will reverse again and the spindle will travel downward. This cycle of operation will continue until you turn the vertical spindle **OFF**.

Coolant System

To use the coolant system on your mill:

1. Make sure the coolant tank is properly serviced and filled with coolant fluid (refer to **Coolant Maintenance** on **Page 51** for detailed instructions).

NOTICE

Running the coolant pump without adequate coolant in the coolant reservoir may permanently damage the coolant system on your mill. This action is considered abuse and is not covered by the warranty.

2. Use the control panel switch to turn the coolant pump **ON**.
3. Position the coolant nozzle appropriately for your operation.
4. Adjust the flow of coolant by using the valve lever at the base of the nozzle hose.



SECTION 5: ACCESSORIES

H2689—R-8 Quick Change Collet Set

An affordable quick change collet system with ultra precision. These spring collets are hardened and ground to exacting tolerances and offer incredible holding power. This set includes an R-8 arbor and nut, spanner wrench, plastic carrying case and collets sized $\frac{1}{8}$ ", $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ ", $\frac{7}{8}$ ", and 1". What's more, the nut features a self-ejecting rim! A set like this will truly speed up any tool changing process. Drawbar size is $\frac{7}{16}$ " x 20.

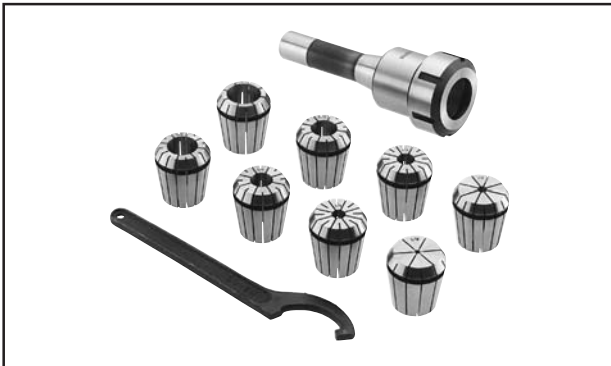


Figure 44. H2689 R-8 Quick Change Collet Set.

G9299—10" Yuasa-Type Rotary Table

This high precision rotary table features extra deep coolant channels, dual positive action locks, very low profiles, 10 second vernier scales, gear drives with oil immersion and satin chrome dials. See the current Grizzly catalog for full specifications. Features: 4.330" overall height (horizontal), 6.750" height to center hole (vertical), #3 Morse Taper, 0.465" T-slot width, and 117 lb approximate shipping weight.

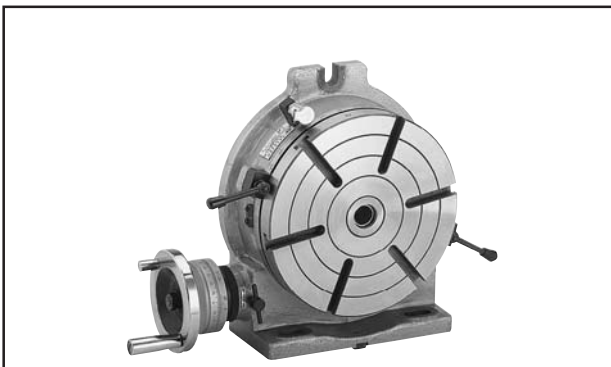


Figure 45. G9299 10" Yuasa-Type Rotary Table.

G1076—52-PC. Clamping Kit

This clamping kit includes 24 studs, six step block pairs, six T-nuts, six flange nuts, four coupling nuts, and six end hold-downs. The rack is slotted so it can be mounted close to the machine for easy access.

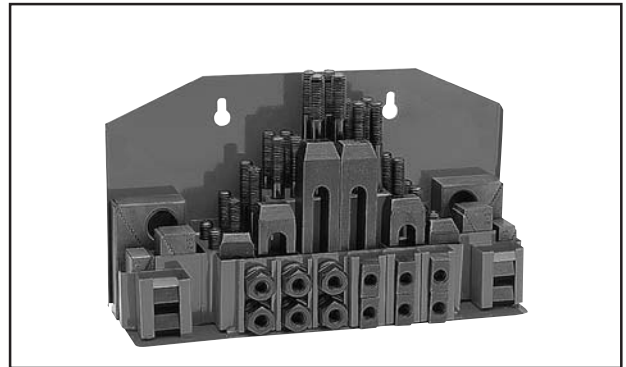


Figure 46. G1076 52-PC. Clamping Kit.

G9324—Boring Head Combo Set

Hardened and ground adjusting screws along with a wide base design guarantee a long life and trouble-free use. Includes a 3" boring head, R-8 shank with $\frac{1}{2}$ "-18 TPI, and a 12 piece $\frac{3}{4}$ " boring bar set.



Figure 47. G9324 Boring Head Combo Set.

Call 1-800-523-4777 To Order



G2861—Face Mill

G4051—Carbide Insert for Face Mill

This 2 1/2" Face Mill accepts four carbide inserts (not included). Comes with an R-8 arbor.



Figure 48. G2861 Face Mill.

G9760—20-PC. 2 & 4 Flute TiN End Mill Set.

Includes these sizes and styles in two and four flute styles: 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 9/16", 5/8", 3/8", 11/16", and 3/4".



Figure 49. G9760 20-PC End Mill Set.

G9765—9-PC. Ball End Mill Set

Features 2 flute ball nose end mills. Includes the following sizes: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4".



Figure 50. G9765 9 PC. Ball End Mill Set.

G5641—1-2-3 Blocks

G9815—Parallel Set

H5556—Edge Finder Set

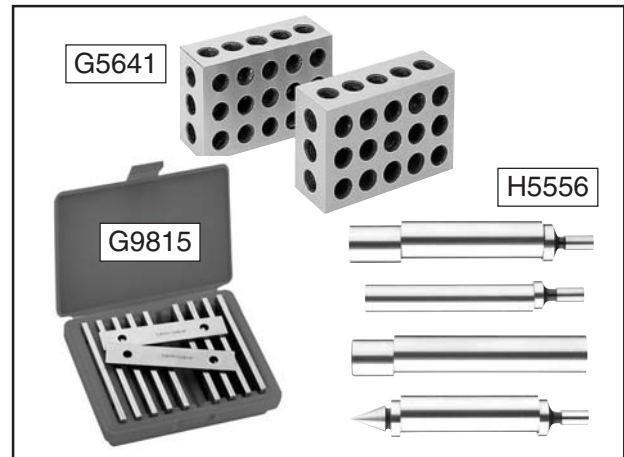


Figure 51. G5641 1-2-3 Blocks, G9815 Parallel Set, and H5556 Edge Finder Set.

G5562—SLIPIT® 1 Qt. Gel

G5563—SLIPIT® 12 oz Spray

G2871—Boeshield® T-9 12 oz Spray

G2870—Boeshield® T-9 4 oz Spray

H3788—G96® Gun Treatment 12 oz Spray

H3789—G96® Gun Treatment 4.5 oz Spray



Figure 52. Recommended products for protecting unpainted cast iron/steel machinery parts.

Call 1-800-523-4777 To Order



SECTION 6: MAINTENANCE



Schedule

For optimum performance from your machine, follow this maintenance schedule and refer to any specific instructions given in this section.

Daily Maintenance:

- Clean machine of all debris and chips.
- Check horizontal spindle V-belt tension, damage, or wear (see **Adjusting/Changing V-Belts** on **Page 57**).
- Lubricate all ball oilers (see **Lubrication** beginning on **Page 44**).
- Thoroughly clean table, saddle, column, and ram ways of debris and chips, then lubricate (see **Lubrication** beginning on **Page 44**).
- Check coolant level and fill if necessary (see **Coolant Maintenance** on **Page 51**).
- Check for any other condition that would hamper the safe and efficient operation of your mill.

Weekly Maintenance:

- Clean and lubricate X-axis (longitudinal), Y-axis (cross), and Z-axis (knee) lead screws (see **Lubrication** beginning on **Page 44**).

Monthly Maintenance:

- Clean debris from inside cabinets and off motors.
- Check vertical and horizontal gear boxes oil levels; fill if needed (see **Lubrication** beginning on **Page 44**).
- Lubricate power feeds (see **Lubrication** beginning on **Page 44**).

Quarterly Maintenance:

- Clean out coolant system and replace coolant fluid (see **Coolant Maintenance** on **Page 51**).
- Lubricate all moving points that have grease fittings (see **Lubrication** beginning on **Page 44**).

Annual Maintenance

- Completely drain and refill vertical and horizontal gear box oil.

Cleaning and Protecting

Metal chips left on the machine that have been soaked with water-based coolant will invite oxidation and a gummy residue build-up around the moving parts. Use a brush and shop vacuum to remove chips and debris from the working surfaces of the mill. Never blow the mill off with compressed air, as this will force metal chips deep into the mechanisms.

Remove any rust build-up from unpainted cast iron surfaces of your mill and treat with a non-staining lubricant after cleaning.

Keep unpainted cast iron surfaces rust-free with regular applications of products like G96® Gun Treatment, SLIPIT®, or Boeshield® T-9 (see **Accessories** beginning on **Page 41**).



Lubrication Overview

The Model G0615/G0616 has numerous moving metal-to-metal contacts that must be properly lubricated to help ensure efficient and long-lasting mill operation.

Refer to **Figure 53** for a recommended schedule of lubrication, and follow the detailed instructions below for your mill.

Note: *This recommended lubrication schedule is based on light to medium mill usage. Keeping in mind that lubrication helps to protect the value and operation of your mill, you may need to perform lubrication tasks more frequently depending on usage.*

Lubrication Category	Frequency
Ball Oilers	8 Hrs. of Use
Oil Cups & One-Shot Way Oiler (Model G0616 only)	8 Hrs. of Use
Lead Screws	Weekly
X-Axis & Y-Axis Power Feeds	Monthly
Grease Fittings	Quarterly
Gear Boxes	Annually

Figure 53. Lubrication categories and frequency.

Model G0615 Lubrication

Ball Oilers

1. DISCONNECT THE MILL FROM POWER!
2. Refer to **Figures 54–60** to identify each of the twelve ball oilers.
3. Depress the ball with the tip of the oil can nozzle and squirt a little ISO 68 or SAE 20 non-detergent oil inside the fitting.
4. Make sure to clean the outside of the ball oiler before and after each use to keep out contaminants.

5. Move the lubricated parts through their full range of travel to evenly distribute the oil.

Back of Model G0615 (Figure 54):

- A. Rear Horizontal Spindle Bushing
- B. Horizontal Arbor Support Bushing

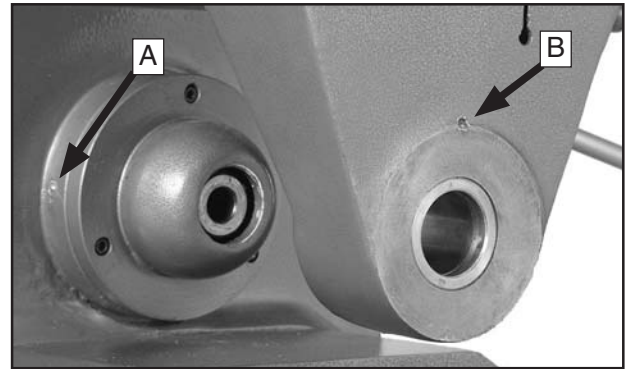


Figure 54. Back of machine ball oilers.

Front of Model G0615 (Figures 55–57):

- C. Saddle Dovetail Way
- D. Front Horizontal Spindle Bushing
- E. Ram Dovetail Way

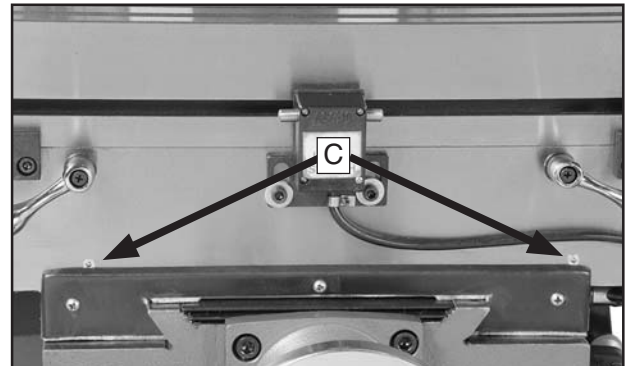


Figure 55. Saddle dovetail way ball oilers.

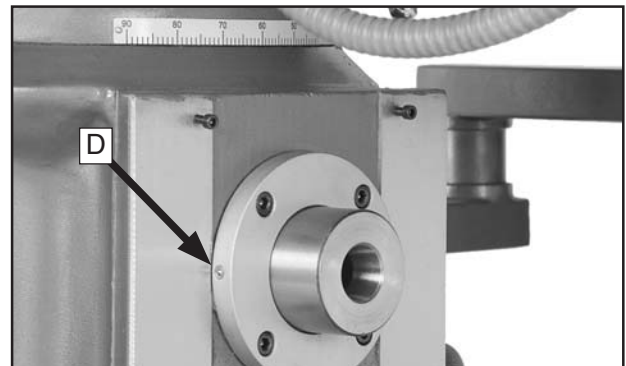


Figure 56. Front horizontal spindle bushing ball oiler.



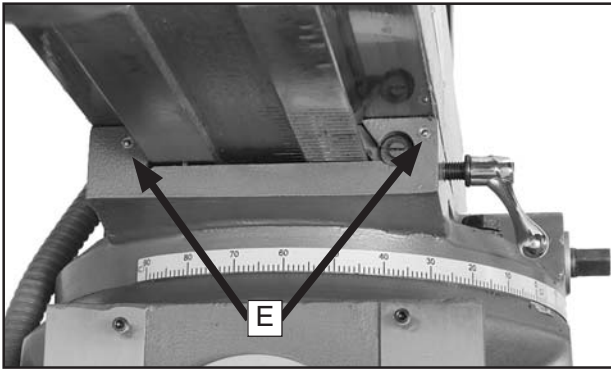


Figure 57. Ram dovetail way ball oilers.

Left Side of Model G0615 (Figures 58–60):

- F.** Table Dovetail Way
- G.** Left Column Dovetail Way
- H.** Left X-Axis Handwheel

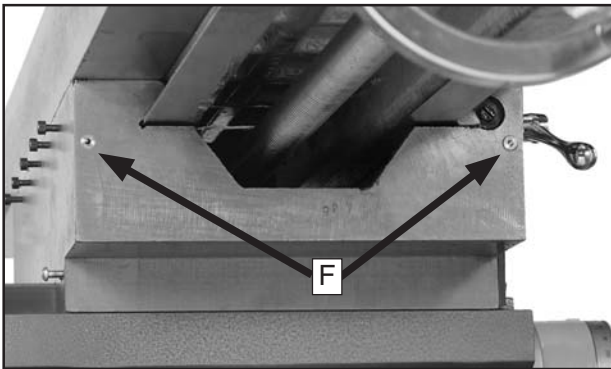


Figure 58. Table dovetail way ball oilers (underneath left side of table).

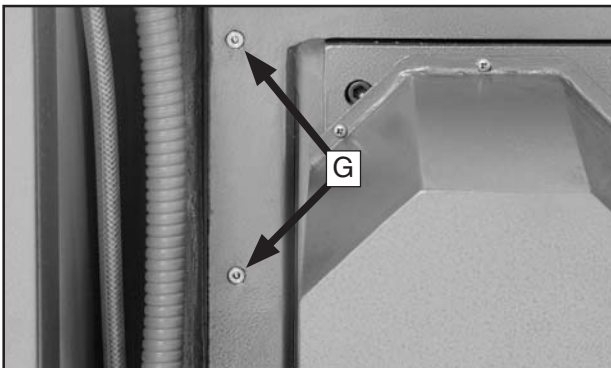


Figure 59. Left side of column dovetail ball oilers.

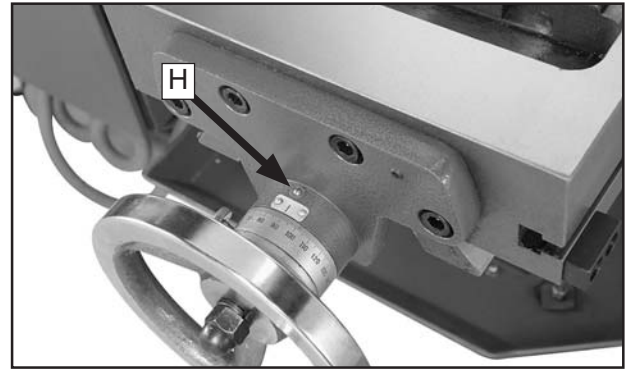


Figure 60. Left X-axis handwheel ball oiler.

Grease Fittings

1. DISCONNECT THE MILL FROM POWER!
 2. Refer to **Figures 61–64** to identify each of the five grease fittings.
 3. Make sure to clean the outside of the grease fittings before and after each use to keep out contaminants.
 4. Use a light all-purpose grease and a grease gun to add a small amount of grease at each fitting.
- Note:** *The amount of grease you need to add at one time depends upon your usage.*
5. Move the corresponding part through its full range of travel to evenly distribute the grease.

Right Side of Model G0615 (Figures 61–62):

- A.** Downfeed Control Gears
- B.** Right Column Dovetail Way

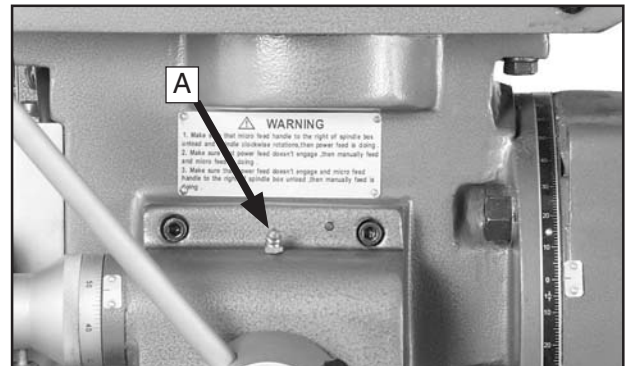


Figure 61. Downfeed gear grease fitting on right side of headstock.



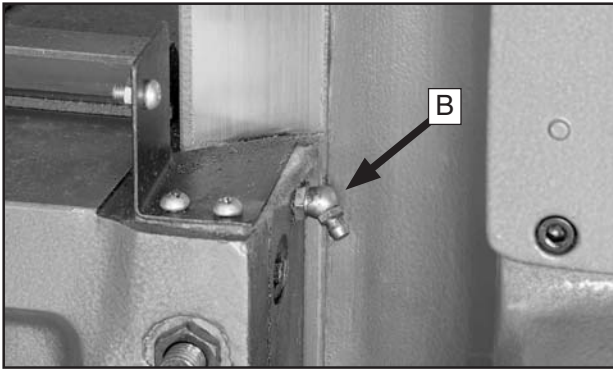


Figure 62. Right side of column dovetail way grease fitting.

Front of Model G0615 (Figure 63):
C. Z-Axis Lead Screw

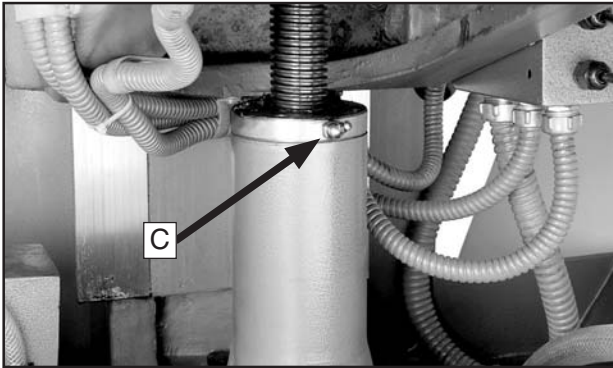


Figure 63. Z-axis lead screw grease fitting (shown from inside knee cavity).

Left Side of Model G0615 (Figure 64):

- D.** Auto-Downfeed Gear
- E.** Auto-Downfeed Lever Push Rod

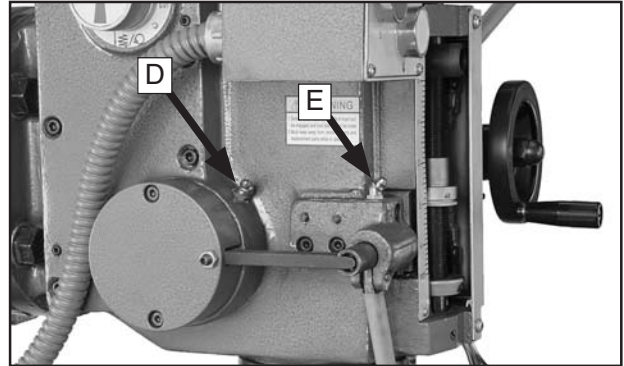


Figure 64. Left side of headstock grease fittings.

Refer to following subsections for the remaining Model G0615 lubrication procedures:

- **Lead Screw Lubrication on Page 49.**
- **Lubricating X & Y-Axis Power Feeds on Page 50.**
- **Gear Box Oil on Page 51.**

NOTICE

Failure to follow reasonable lubrication practices as outlined in this manual for your mill could lead to premature failure of your mill and may void the warranty.



Model G0616 Lubrication

Ball Oilers

1. DISCONNECT THE MILL FROM POWER!
2. Refer to **Figures 65–66** to identify each of the following ball oilers:
 - A. Horizontal Arbor Support Bushing
 - B. Front Horizontal Spindle Bushing

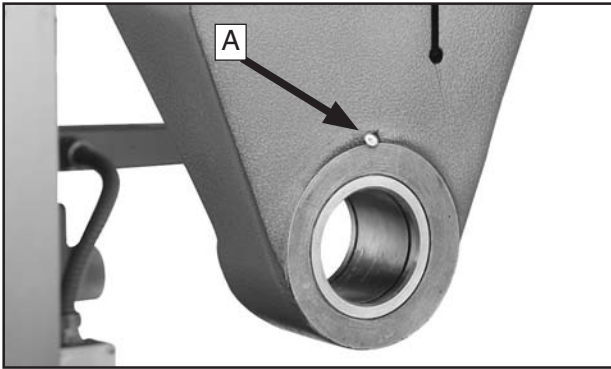


Figure 65. Horizontal arbor support bushing ball oiler (shown from the back of the mill).

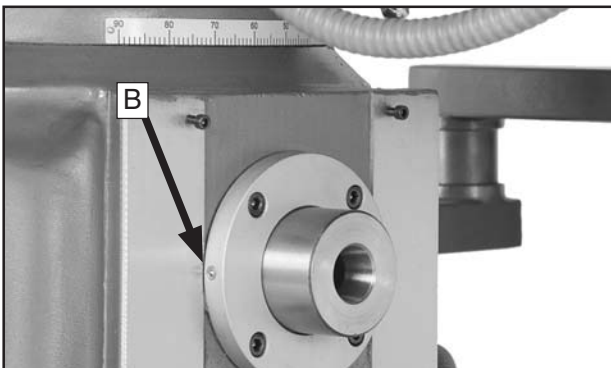


Figure 66. Front horizontal spindle bushing ball oiler.

3. Depress the ball with the tip of the oil can nozzle and squirt a little ISO 68 or SAE 20 non-detergent oil inside the fitting.
4. Make sure to clean the outside of the ball oiler before and after each use to keep out contaminants.

5. Move the lubricated parts through their full range of travel to evenly distribute the oil.

Oil Cups

1. DISCONNECT THE MILL FROM POWER!
2. Apply two squirts of ISO 68 or SAE 20 non-detergent oil into the five small oil cups—two on the left of the Z-axis way, and three on the right (see **Figure 67**).



Figure 67. Z-axis way oil cups (left side shown).

3. Move the knee along the full length of the Z-axis to evenly distribute the lubricant.

Grease Fittings

1. DISCONNECT THE MILL FROM POWER!
2. Refer to **Figures 68–70** to identify each of the four grease fittings.
3. Make sure to clean the outside of the grease fittings before and after each use to keep out contaminants.
4. Use a light all-purpose grease and a grease gun to add a small amount of grease at each fitting.

Note: *The amount of grease you need to add at one time depends upon your usage.*



5. Move the corresponding part through its full range of travel to evenly distribute the grease.

Right Side of Model G0616 (Figure 68):

- A.** Downfeed Control Gears

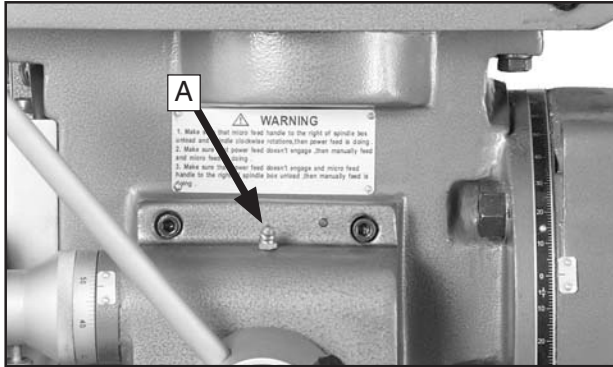


Figure 68. Downfeed gear grease fitting on right side of headstock.

Front of Model G0616 (Figure 69):

- B.** Z-Axis Lead Screw

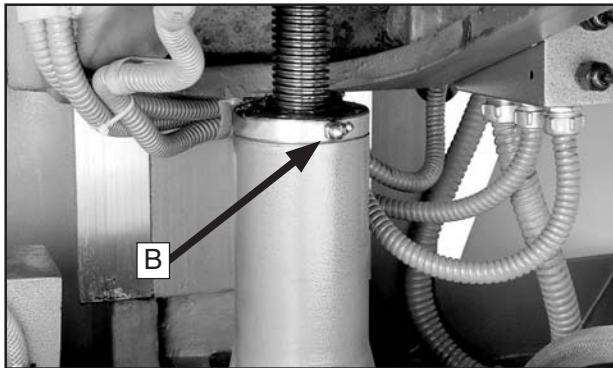


Figure 69. Z-axis lead screw grease fitting (shown from inside knee cavity).

Left Side of Model G0616 (Figure 70):

- C.** Auto-Downfeed Gear
D. Auto-Downfeed Lever Push Rod

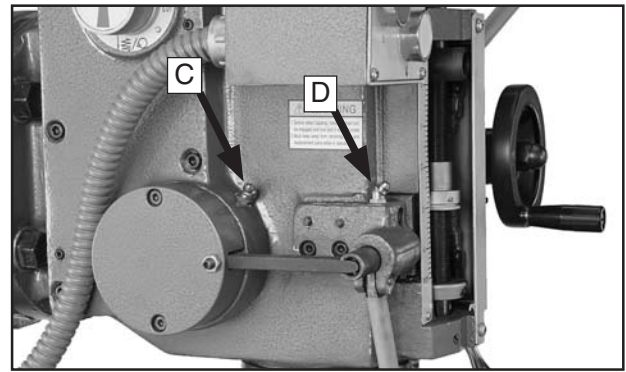


Figure 70. Left side of headstock grease fittings.

The Model G0616 uses a one-shot oiler system to lubricate the table and saddle ways through a system of copper tubes running underneath the table (see **Figure 71**).



Figure 71. One-shot oiler.

One-Shot Oiler

1. Make sure the reservoir of the one-shot oiler is at least $\frac{3}{4}$ full of ISO 68 or SAE 20 oil.
2. Pull the T-handle on the side of the one-shot oiler fully out, then release it.

Note: As the spring-loaded T-handle returns inside the one-shot oiler, the oil is slowly distributed to the table and saddle ways. To avoid creating a harmful amount of oil pressure, do NOT push the T-handle in.

Refer to following subsections for the remaining Model G0616 lubrication procedures:

- **Lead Screw Lubrication** on **Page 49**.
- **Lubricating X & Y-Axis Power Feeds** on **Page 50**.
- **Gear Box Oil** on **Page 51**.

NOTICE

Failure to follow reasonable lubrication practices as outlined in this manual for your mill could lead to premature failure of your mill and may void the warranty.



Lead Screw Lubrication

To lubricate the lead screws:

1. DISCONNECT THE MILL FROM POWER!
2. Refer to **Figures 72–73** to identify X and Y-axis lead screws.

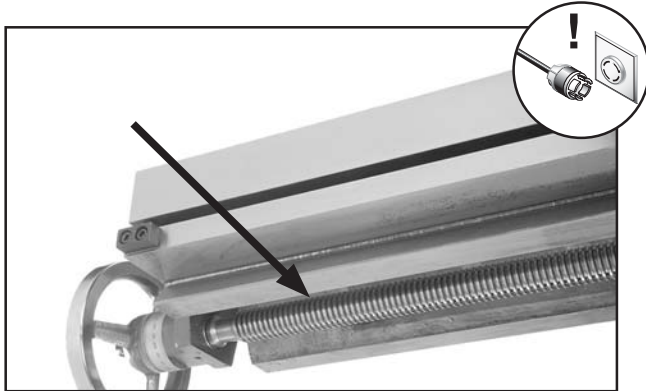


Figure 72. X-axis lead screw (shown from underneath the left side of table).

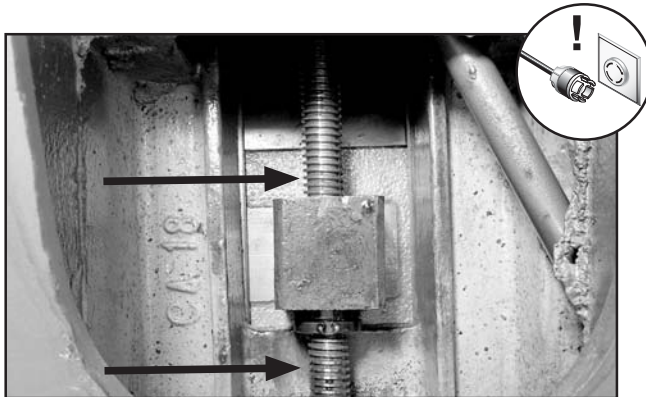


Figure 73. Y-axis lead screw (looking up inside knee cavity).

3. Brush the length of the lead screws with a light coat of medium weight white lithium grease.
4. Move the corresponding part through its full range of travel to evenly distribute the grease.

Note: You will need to remove the way cover from behind the table to complete the next step.

5. Position the table along the Y-axis so that you can slide the wiper plates apart to access the three Z-axis beveled gears (see **Figure 74**).

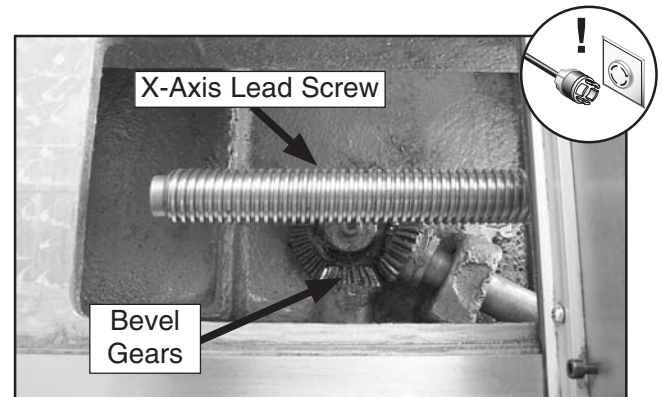


Figure 74. Z-axis bevel gears as seen through wiper plates at the rear of the table.

6. Use a long handled brush to apply a light coat of medium weight white lithium grease on all three Z-axis beveled gears.
7. Re-distribute the wiper plates and re-install the way cover.



Lubricating X & Y-Axis Power Feeds

To lubricate the X & Y-axis power feeds:

1. DISCONNECT THE MILL FROM POWER!
2. Use a 19mm wrench to remove the center acorn nut, lock washer, and handwheel from the power feed.
3. Unthread and remove the knurled retaining ring and graduated dial from the end of the lead screw (see **Figure 75**).

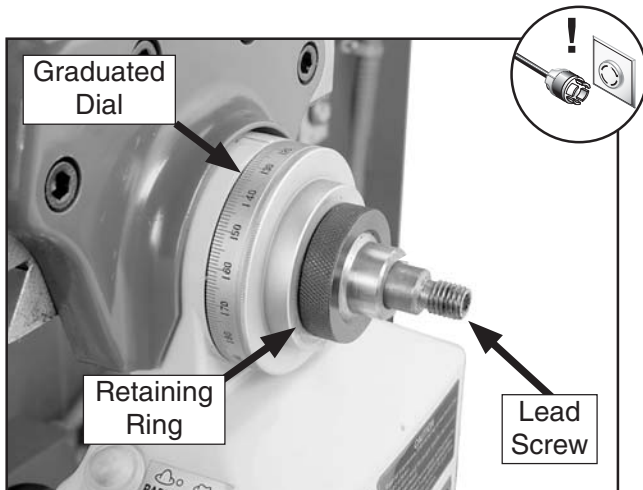


Figure 75. Power feed retaining ring and graduated dial.

4. Remove the brass gear from the end of the lead screw.

Note: Make sure to remove and retain the small alignment key from the indentation on the lead screw (see **Figure 76**).

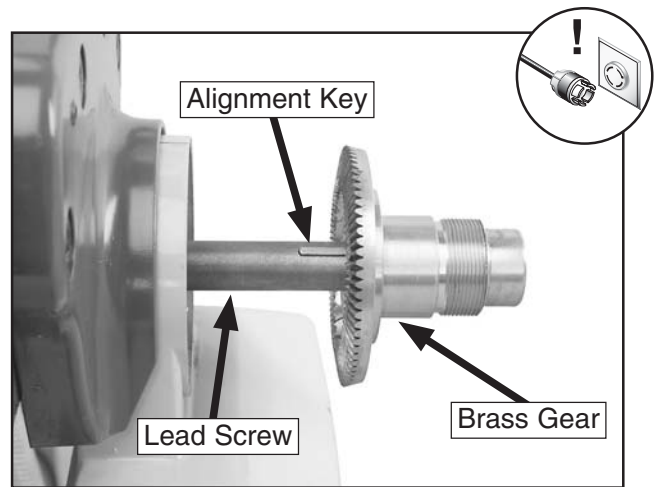


Figure 76. Power feed alignment key and brass gear.

5. Brush medium weight white lithium grease on the teeth of the brass gear and the smaller drive gear (see **Figure 77**).

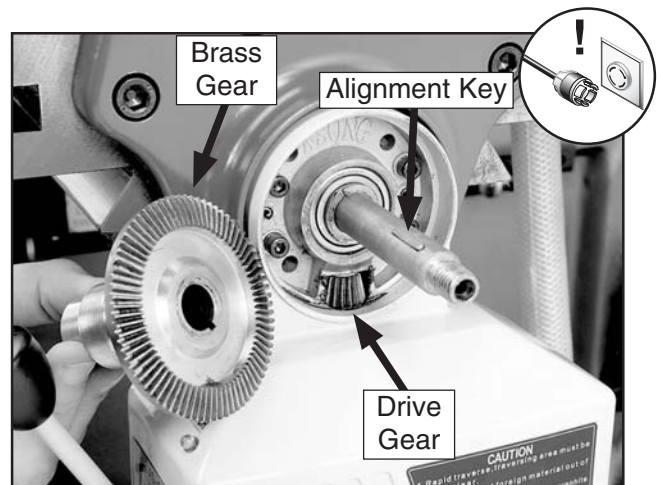


Figure 77. Power feed gears.

6. Align the keyway of the brass gear with the alignment key as you slide it onto the lead screw and into the power feed housing.
7. Secure the graduated dial onto the lead screw with the knurled retaining ring—do not overtighten.
8. Align the keyway of the handwheel with the lead screw key as you slide it onto the lead screw, and secure it with the acorn nut and lock washer.
9. Use the handwheel to check the gear operation of the power feed and to distribute the grease on the gears.



Gear Box Oil

Both the vertical and horizontal gear boxes use a 20W non-detergent gear oil. The oil level should be kept at the indicator mark in the sight glasses (see **Figures 78–80**).

DISCONNECT THE MILL FROM POWER BEFORE SERVICING THE GEAR BOXES!

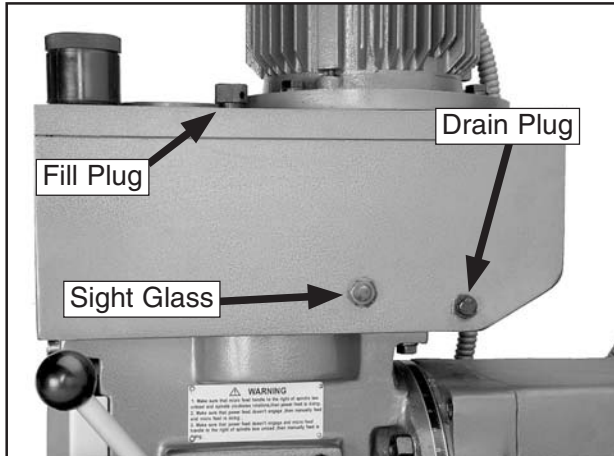


Figure 78. Vertical gear box oil parts.

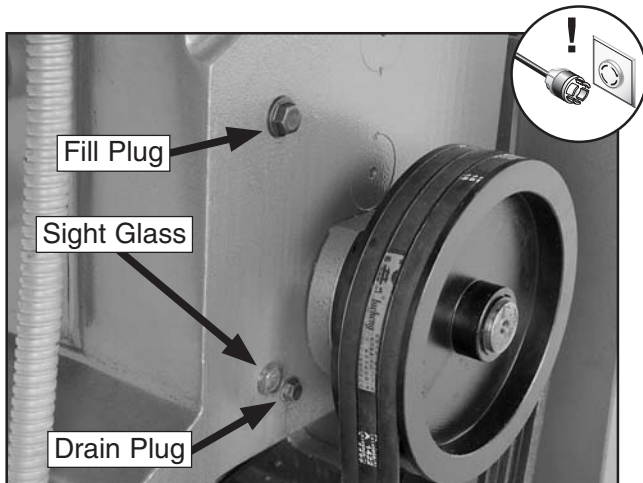


Figure 79. Model G0615 horizontal gear box oil parts (shown with rear access panel open).

Note: For both models, the horizontal gear box oil sights and plugs are accessed from the back of the mill by moving the back column cover out of the way.

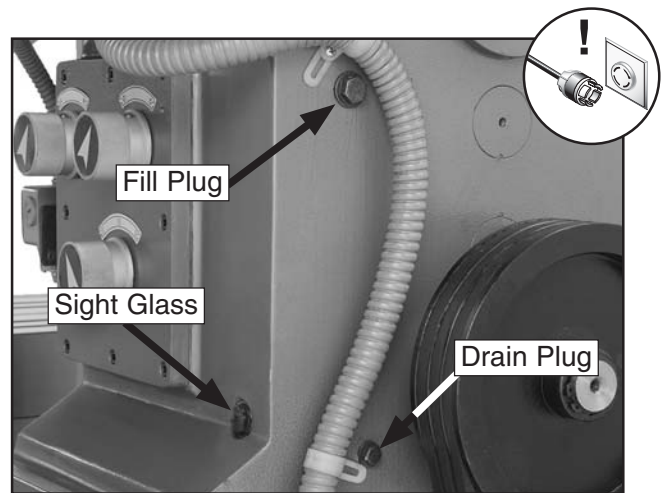


Figure 80. Model G0616 horizontal gear box oil parts (shown with rear access panel removed).

After the initial spindle break-in and again after the first three months of operation, drain the vertical and horizontal gear box oil completely and refill. After that, change the gear box oil on an annual basis or more frequently if heavier machine use requires it.

Coolant Maintenance

	<p>! WARNING</p> <p>Coolant fluid is a potent and extremely poisonous solution to humans and animals. Use personal protective equipment when handling coolant fluid to prevent infections or poisoning.</p>
--	--

A small amount of coolant is lost during normal operation. Check the reservoir coolant level periodically and fill if necessary.

To check/add coolant:

1. **DISCONNECT THE MILL FROM POWER!**



- Remove the coolant drain screen and inspect how far the coolant is from the top of the tank (see **Figure 81**).

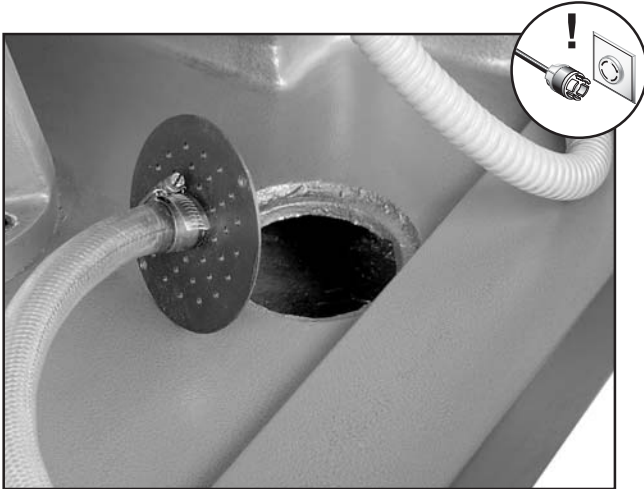


Figure 81. Coolant drain screen found inside the bottom splash pan.

NOTICE

Running the coolant pump without adequate coolant in the coolant reservoir may permanently damage the coolant system on your mill. This action is considered abuse and is not covered by the warranty.

- If the coolant is more than 2" from the top of the tank, add more coolant to fill the tank.
- Replace the coolant drain screen.

! WARNING

Always use non-flammable water based coolant fluids to avoid explosions when the coolant comes in contact with hot metal chips from the milling operation. For the best protection and use, always follow the coolant manufacturer's recommendations for coolant/water ratios.

! WARNING

The coolant reservoir on this mill is designed to store only coolant fluid. During storage some fluids grow dangerous microbes, or, due to the collection of toxic metal chips in the fluid, the fluid can become a potent and extremely poisonous solution to humans and animals.

Use the correct personal protection equipment when handling cutting fluids to prevent infections and poisoning.

Follow Federal, State, and the coolant manufacturer's requirements to properly dispose of used coolant fluid.

The Model G0615/G0616 coolant reservoir holds approximately four gallons of coolant. We recommend changing this fluid every three months or sooner if it develops an unpleasant odor.

To change the coolant fluid:

- Locate the coolant drain plug underneath the splash pan on the side of the base.
- Place an oil pan under the drain plug, remove the drain plug, and allow the coolant to drain completely.
- Remove the coolant drain screen, and clean out any sludge and debris from within the coolant reservoir. Use a magnet to remove metal particles.
- Replace and secure the drain plug.
- Pour a new, clean mixture of coolant into the hole where you removed the drain screen, and fill the reservoir to the top.
- Replace the drain screen and check the coolant system for proper operation.



SECTION 7: SERVICE

Review the troubleshooting and procedures in this section to fix or adjust your machine if a problem develops. If you need replacement parts or you are unsure of your repair skills, then feel free to call our Technical Support at (570) 546-9663.

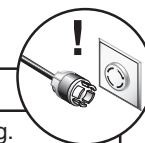
Troubleshooting



Motor & Electrical

Symptom	Possible Cause	Possible Solution
Machine does not start or a breaker trips.	<ol style="list-style-type: none"> Emergency stop push-button is engaged/faulty. Plug/receptacle is at fault or wired incorrectly. Motor connection wired incorrectly. Wall fuse/circuit breaker is blown/tripped. Thermal overload relay has tripped. Contactors not getting energized/has burnt contacts. Power supply switched OFF or is at fault. Wiring is open/has high resistance. Motor ON button or main power switch is at fault. Rear access panel open; safety switch is at fault. Table position limit switch is depressed/at fault. Control panel is at fault. Motor is at fault. 	<ol style="list-style-type: none"> Rotate clockwise slightly until it pops out/replace it. Test for good contacts; correct the wiring. Correct motor wiring connections. Ensure circuit size is suitable for this machine; replace weak breaker. Turn cut-out dial to increase working amps and push the reset pin. Replace if tripped multiple times (weak relay). Test for power on all legs and contactor operation. Replace unit if faulty. Ensure power supply is switch on; ensure power supply has the correct voltage. Check for broken wires or disconnected/corroded connections, and repair/replace as necessary. Replace faulty ON button or ON/OFF switch. Close cover; replace faulty switch. Adjust table height to correct working range; replace faulty limit switch. Inspect/repair control box wiring. Test/repair/replace.
Machine stalls or is underpowered.	<ol style="list-style-type: none"> Feed rate/cutting speed too fast for task. Workpiece alignment is poor. Wrong workpiece material. Gearbox is at fault. Motor connection is wired incorrectly. V-belt(s) slipping. 	<ol style="list-style-type: none"> Decrease feed rate/cutting speed. Eliminate workpiece binding; use jig or clamps and position table properly for workpiece alignment control. Use metal with correct properties for your type of machining. Select appropriate gear ratio; replace broken or slipping gears. Correct motor wiring connections. Replace bad V-belt(s) as a matched set, align pulleys, and re-tension (see Page 57).





Symptom	Possible Cause	Possible Solution
Machine stalls or is underpowered.	<ol style="list-style-type: none"> 7. Plug/receptacle is at fault. 8. V-belt pulley/sprocket slipping on shaft. 9. Motor bearings are at fault. 10. Machine is undersized for the task. 11. Motor has overheated. 12. Contactor not getting energized or has poor contacts. 13. Spindle rotation switch at fault. 14. Motor is at fault. 	<ol style="list-style-type: none"> 7. Test for good contacts; correct the wiring. 8. Replace loose V-belt pulley/shaft. 9. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement. 10. Use smaller sharp cutters/drill bits; reduce the feed rate; reduce the spindle RPM; use cutting fluid if possible. 11. Clean off motor, let cool, and reduce workload. 12. Test for power on all legs and contactor operation. Replace if faulty. 13. Test/repair/replace switch. 14. Test/repair/replace motor.
Machine has vibration or noisy operation.	<ol style="list-style-type: none"> 1. Motor or component is loose. 2. V-belts are slapping belt cover; are worn or loose. 3. Belt pulley is loose. 4. Motor mount loose/broken. 5. Machine is incorrectly mounted or sits unevenly. 6. Workpiece is loose. 7. Motor fan is rubbing on fan cover. 8. Cutter is at fault. 9. Bit is chattering. 10. Motor bearings are at fault. 11. Gearbox is at fault. 	<ol style="list-style-type: none"> 1. Inspect/replace stripped or damaged bolts/nuts, and re-tighten with thread locking fluid. 2. Replace/realign V-belts with a new matched set (refer to Page 57). 3. Replace shaft, pulley, setscrew, and key as required. 4. Tighten/replace. 5. Tighten/replace anchor studs in floor; relocate/shim machine. 6. Use the correct holding fixture and reclamp workpiece. 7. Replace dented fan cover; replace loose/damaged fan. 8. Replace out-of-round cutter; replace/resharpen cutter; use appropriate feed rate and cutting RPM. 9. Replace/sharpen bit; index bit to workpiece; use appropriate feed rate and cutting RPM (see Page 28). 10. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement. 11. Rebuild gearbox for bad gear(s)/bearing(s).



Operation and Work Results



SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Tool slips in collet.	<ol style="list-style-type: none"> 1. Collet is not fully drawn up into spindle taper. 2. Wrong size collet. 3. Debris in collet or in spindle taper. 4. Taking too big of a cut. 	<ol style="list-style-type: none"> 1. Snug up draw bar. 2. Measure tool shank diameter and match with appropriate diameter collet. 3. Remove all oil and debris from collet and spindle taper. 4. Lessen depth of cut and allow chips to clear.
Breaking tools or cutters.	<ol style="list-style-type: none"> 1. RPM and or feed rate is too fast. 2. Cutting tool getting too hot. 3. Taking too big of a cut. 	<ol style="list-style-type: none"> 1. Set correct RPM and feed rates (see Page 28). 2. Use coolant fluid or oil for appropriate application. 3. Lessen depth of cut and allow chips to clear.
Machine is loud when cutting. Overheats or bogs down in the cut.	<ol style="list-style-type: none"> 1. Excessive depth of cut. 2. Dull cutting tools. 	<ol style="list-style-type: none"> 1. Decrease depth of cut. 2. Use sharp cutting tools.
Workpiece vibrates or chatters during operation.	<ol style="list-style-type: none"> 1. Table locks not tight. 2. Quill lock not tight. 3. Workpiece not securely clamped to table or into mill vice. 4. RPM and feed rate too high. 	<ol style="list-style-type: none"> 1. Tighten down table locks. 2. Tighten quill lock. 3. Check that clamping is tight and sufficient for the job. Make sure mill vice is tight to the table. 4. Use appropriate RPM and feed for the job (see Page 28).
Table hard to move.	<ol style="list-style-type: none"> 1. Table locks are tightened down. 2. Chips have loaded up on ways. 3. Ways are dry and in need of lubrication. 4. Limit stops are interfering. 5. Gibs are too tight. 	<ol style="list-style-type: none"> 1. Make sure table locks are fully released. 2. Frequently clean away chips that load up during milling operations. 3. Lubricate ways and handles. 4. Check to make sure that all limit stops are floating and not hitting the limit switch. 5. Adjust gibs (see Page 56).
Bad surface finish.	<ol style="list-style-type: none"> 1. Wrong RPM or feed rate. 2. Dull cutting tool or poor cutting tool selection. 3. Wrong rotation of cutting tool. 4. Workpiece not securely clamped. 	<ol style="list-style-type: none"> 1. Adjust for appropriate RPM and feed rate (see Page 28). 2. Sharpen cutting tool or select a better cutting tool for the intended operation. 3. Check for proper cutting rotation for cutting tool. 4. Secure properly.



Adjusting Gibs

The gibs control the accuracy of table and ram movements along the ways. Tight gibs make the movements more accurate, but harder to move. Loose gibs make the movements sloppy, but easy to move. The goal of gib adjustment is to remove unnecessary sloppiness without causing the ways to bind.

NOTICE

Excessively loose gibs may cause poor finishes on the workpiece and may cause undue wear of sliding surfaces and ways. Over-tightening the gibs may cause premature wear of these sliding devices.

Each sliding device on the Model G0615/G0616 has a tapered gib that is sandwiched between that device and the edge of the way. There are two adjusting screws for the gib—one on both ends of the gib.

Note: *The exception to this gib arrangement is the gib for the column dovetail way on the Model G0615, which is explained in detail at the end of this subsection.*

DISCONNECT THE MILL FROM POWER BEFORE ADJUSTING THE GIBS!

Adjust the gibs by loosening one screw and tightening the other at the opposite end until a slight drag is felt when moving the sliding device; then tighten the loose screw at the other end to lock the setting in place.

Refer to **Figures 82–85** for the locations of one end of each gib. There are some differences between the Models G0615 and G0616 that are noted.

Note: *Some minor components must be removed to access all the gib adjustment screws.*

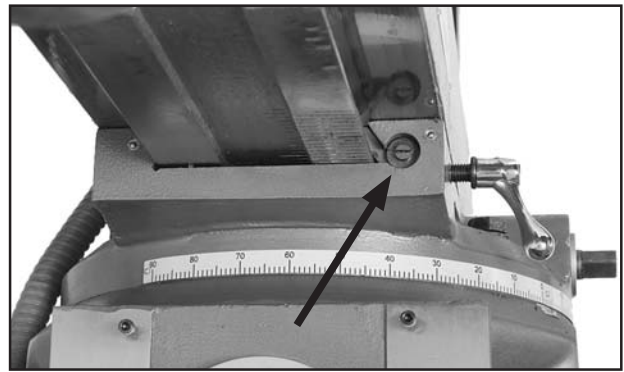


Figure 82. Ram gib and adjusting screw (shown from the front).

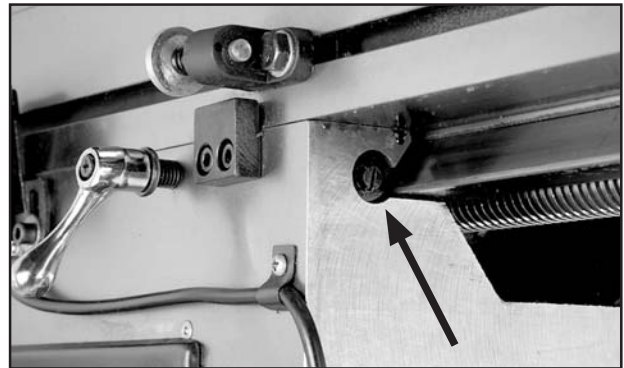


Figure 83. Table gib and adjusting screw (shown from underneath right side of table).

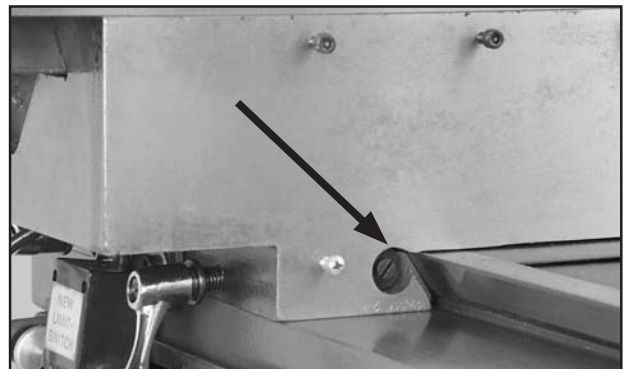


Figure 84. Saddle gib and adjusting screw (shown from rear of saddle).



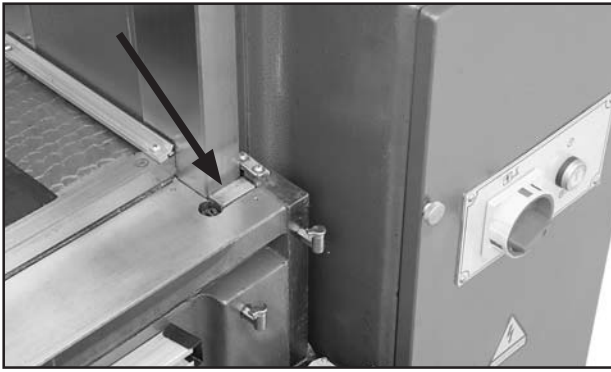


Figure 85. Model G0616 column gib and adjusting screw (shown from right top of knee way).

The Model G0615 uses two tapered gibs for the column way and requires a different procedure for adjustment than described above.

To adjust the column gibs for the Model G0615:

1. Locate the four locking and four adjusting set screws for the two column gibs on the right side of the knee (see **Figure 86**).

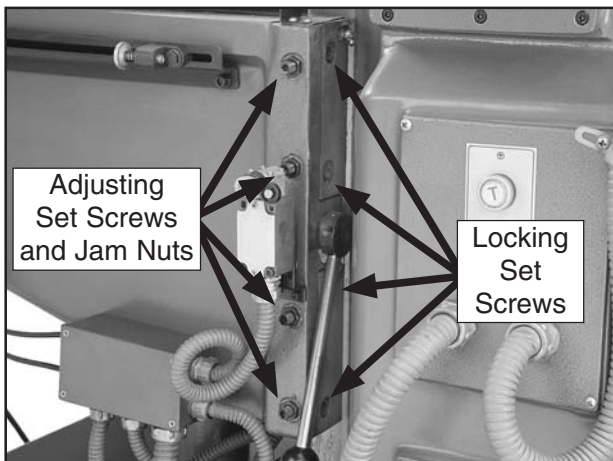


Figure 86. Model G0615 column gib set screws (shown from right side of knee way).

2. Use a 10mm hex wrench to loosen the four locking set screws.
3. Loosen the four jam nuts on the adjusting set screws with an 18mm wrench, and back out the set screws two full turns with a 6mm hex wrench—the two gibs should now be free and loose.

4. Tighten the adjusting set screws for each gib alternately until both gibs are just touching the dovetail way along their full length; then tighten the locking set screws and the jam nuts.
5. Test the gib adjustment by moving the knee up and down. Repeat **Steps 2–5** as necessary until you are satisfied.

Note: *The adjusting parameters for these gibs are the same given for the other gibs earlier in this section—just snug enough to cause a slight drag.*

Adjusting/Changing V-Belts

The horizontal spindle motor uses three V-belts to transfer power to the horizontal spindle gear box axle.

As V-belts wear, they will normally stretch slightly. During regular maintenance, check the condition and tension of the V-belts and use the steps below to adjust them if required.

If the V-belts need to be changed, always install three new belts as a set to maintain even distribution of power transfer across the pulleys.

To adjust/change the V-belts for the Model G0615:

1. DISCONNECT THE MILL FROM POWER!
2. Open the rear access panel.



3. Use an 18mm wrench to loosen the top hex nuts on the motor retaining bolts (see **Figure 87**).

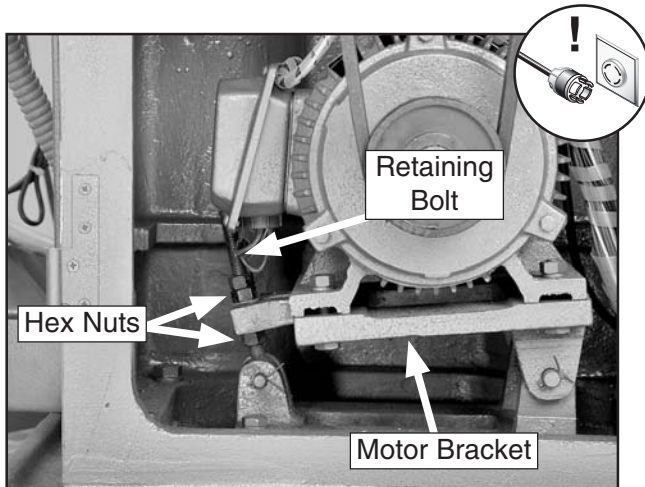


Figure 87. Model G0615 horizontal spindle motor retaining bolt.

To adjust the V-belt tension:

- a. Rotate the bottom hex nuts on the retaining bolt down.
- b. Press down on the motor until the V-belts have about $\frac{1}{4}$ " deflection when pressed in midway between the pulleys (see **Figure 88**).

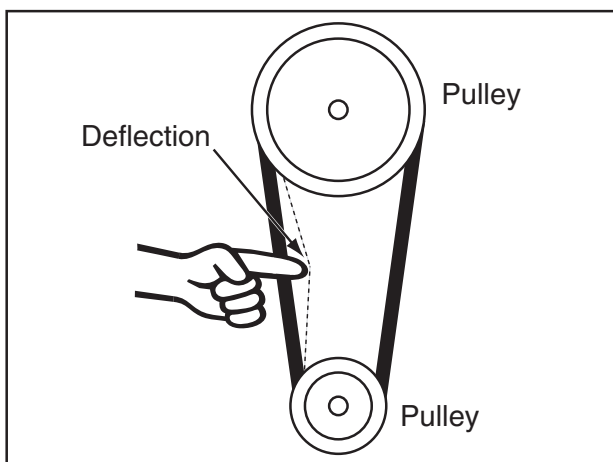


Figure 88. Testing for $\frac{1}{4}$ " deflection of the V-belts.

- c. Tighten the top hex nuts down to hold the motor in place; then tighten the bottom hex nut up to secure the setting.

To change the V-belts:

- a. Loosen the top hex nuts enough to swing the retaining bolt away from the motor bracket.
- b. While lifting the motor up, remove and replace the V-belts.
- c. Follow the steps described above to properly tension the V-belts.

4. Close and secure the rear access panel.

Note: The Model G0615 rear access panel has a power disconnect switch that prevents power connecting to any powered device on the mill when the access panel is open.

To adjust/change the V-belts for the Model G0616:

1. DISCONNECT THE MILL FROM POWER!
2. Remove the rear access panel by loosening the six cap screws with a 6mm hex wrench.
3. Use a 10mm hex wrench to loosen the four cap screws of the motor mount (see **Figure 89**).

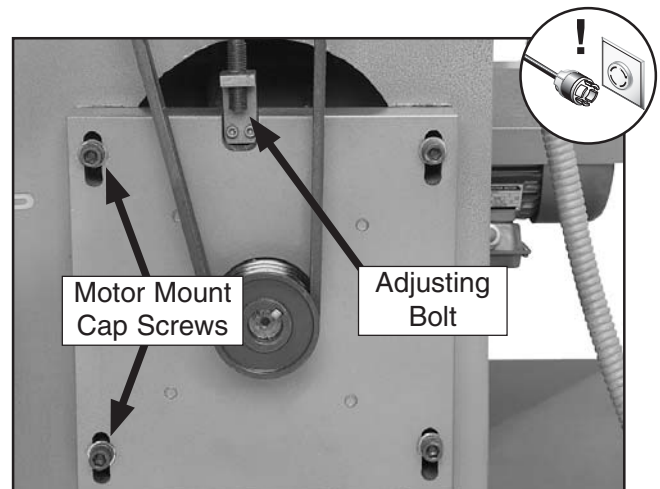


Figure 89. Model G0616 motor mount and fasteners.



To adjust the V-belt tension:

- a. Use a 12mm wrench to rotate the adjusting bolt counterclockwise (pushing the motor down) until the V-belts have about $\frac{1}{4}$ " deflection when pressed in midway between the pulleys (see **Figure 88**).
- b. Tighten the four motor mount cap screws to secure the setting.

To change the V-belts:

- a. Use a 12mm wrench to rotate the adjusting bolt clockwise (pulling the motor up) until you can roll the V-belts off the pulleys and replace them with a new set.
 - b. Follow the instruction above to properly adjust the V-belt tension.
4. Reinstall and secure the rear access panel before connecting the mill to power.

X & Y-Axis Lead Screw Backlash

Backlash is that range of motion that the lead screw rotates before the table begins to move. Lead screws have a certain amount of backlash that will increase with wear. Generally, about 0.010" of backlash is acceptable.

To adjust the X-axis lead screw backlash:

1. DISCONNECT THE MILL FROM POWER!
2. Locate the lead screw backlash adjusting screws underneath the left side of the table, as shown in **Figure 90**.

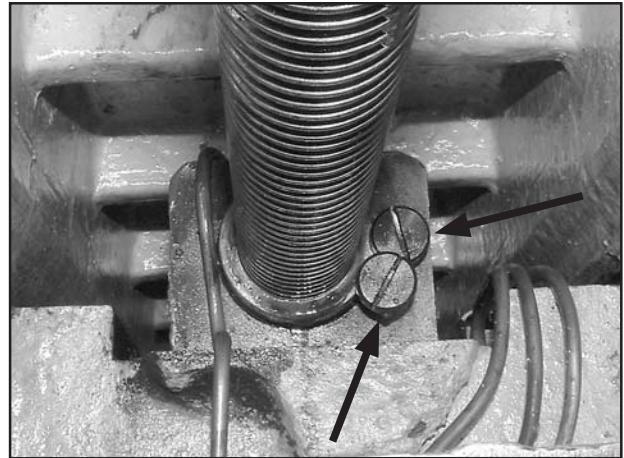


Figure 90. X-axis lead screw backlash adjusting screws.

Note: When tightened down, the top screw locks the setting of the bottom screw. The bottom screw adjusts the amount of backlash.

3. Loosen the top screw and tighten the bottom screw until slightly snug.
4. Re-tighten the top screw to lock the position of the bottom screw.
5. Check the amount of backlash by rotating the X-axis handwheel and repeat **Steps 3–4** if necessary.

To access the backlash adjusting screws for the Y-axis lead screw, remove the power feed unit and mountings.

To adjust the Y-axis lead screw backlash:

1. DISCONNECT THE MILL FROM POWER!
2. Use the Y-axis handwheel to move the table all the way forward.
3. Use a 19mm wrench to remove the center acorn nut of the Y-axis handwheel.



4. Remove the lock washer, handwheel, small lead screw key, and bushing.
5. Unthread and remove the knurled ring and the graduated dial.
6. Remove the long key and flat spacers from the lead screw.
7. Use a 5mm hex wrench to remove the four cap screws that secure the power feed assembly to the mill (see **Figure 91**).

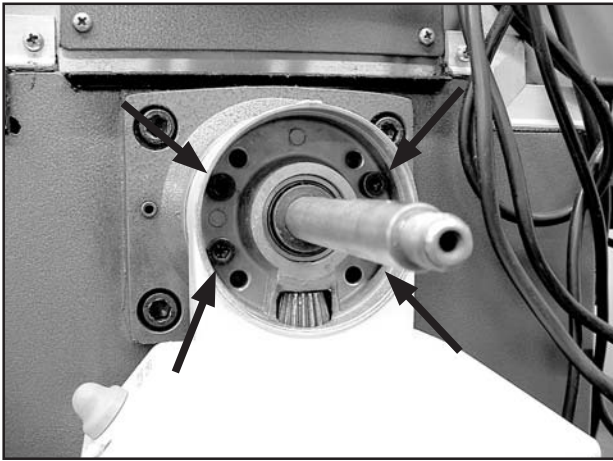


Figure 91. Locations of Y-axis power feed mounting cap screws.

8. Remove the power feed assembly and the bushing behind it from the lead screw.
9. Use a 5mm hex wrench to remove the three cap screws and retaining ring (see **Figure 92**).

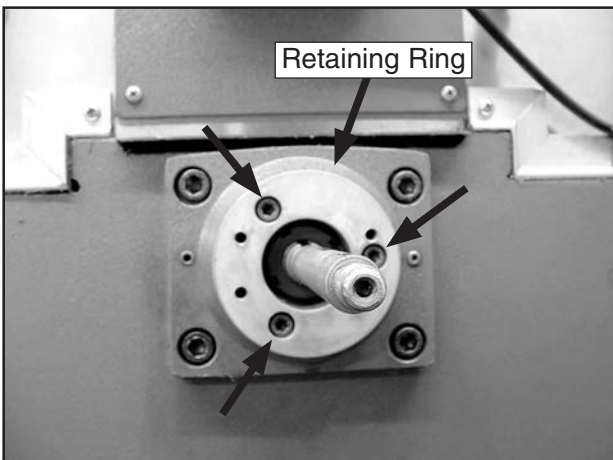


Figure 92. Y-axis lead screw retaining ring and cap screws.

10. Straighten the bent tab of the locking washer from the spanner nut, and remove both the spanner nut and washer (see **Figure 93**).

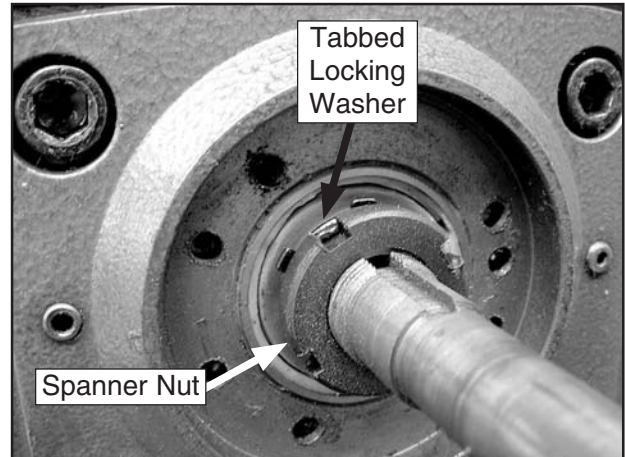


Figure 93. Y-axis lead screw spanner nut and tabbed locking washer.

11. Use an 8mm hex wrench to remove the four cap screws and mounting plate (see **Figure 94**).

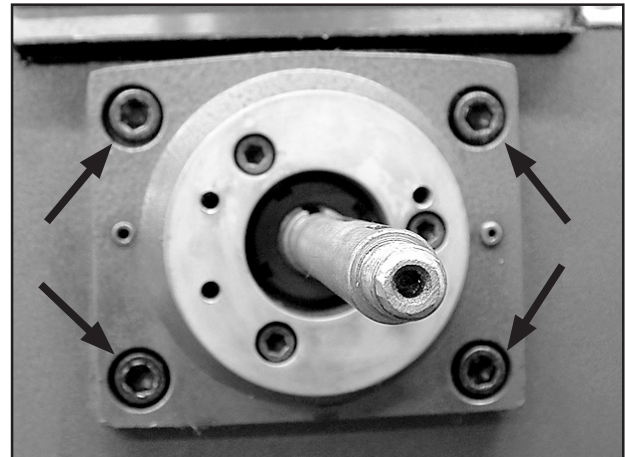


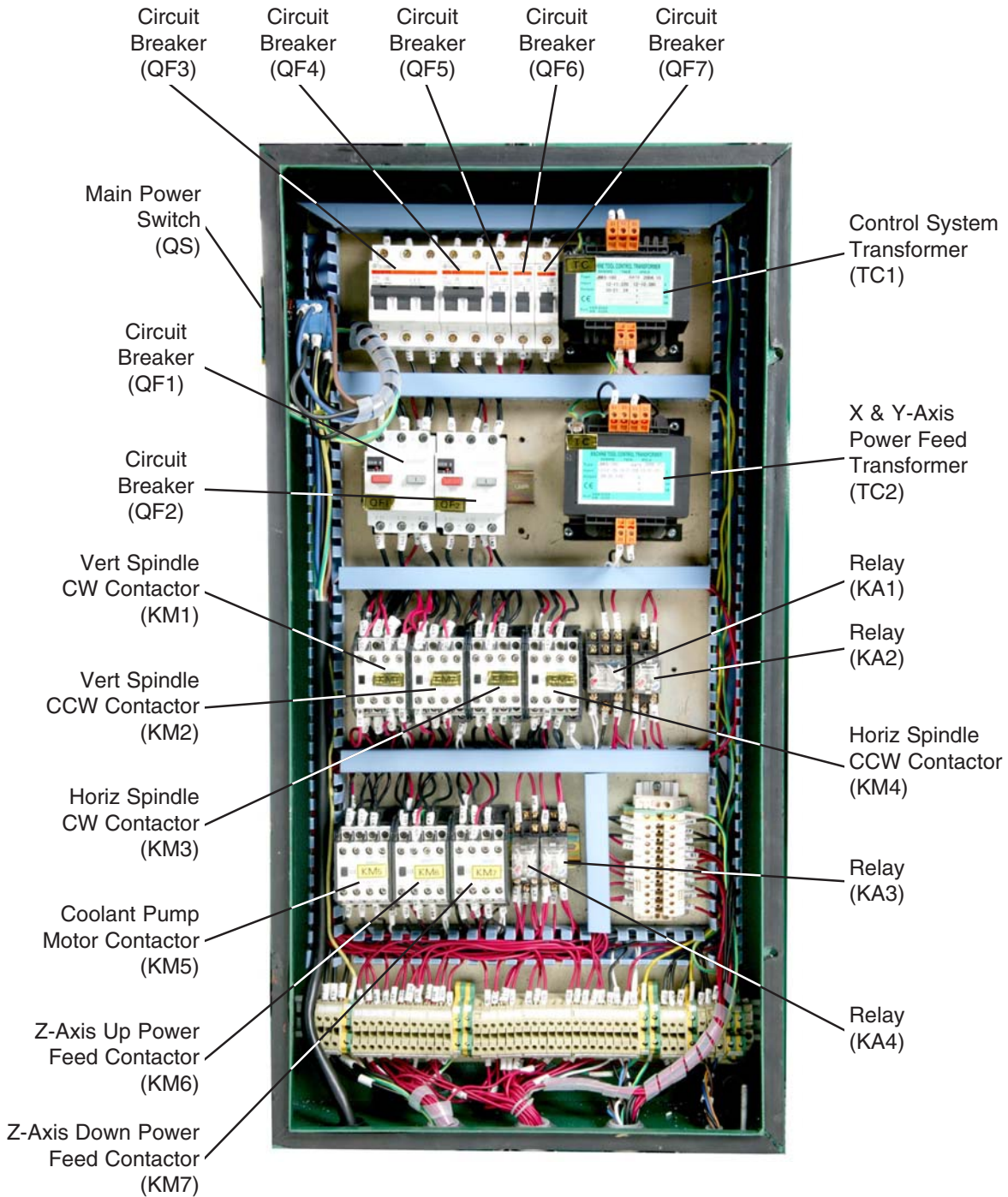
Figure 94. Y-axis lead screw mounting plate, cap screws.

12. Locate the Y-axis lead screw backlash adjusting screws by looking into the mounting bracket hole.
13. Follow the same method of backlash adjustment as detailed for the X-axis lead screw on **Page 59**.
14. To re-install the power feed and lead screw components, follow the above instructions in reverse.



SECTION 8: ELECTRICAL

G0615 Electrical Box Identification

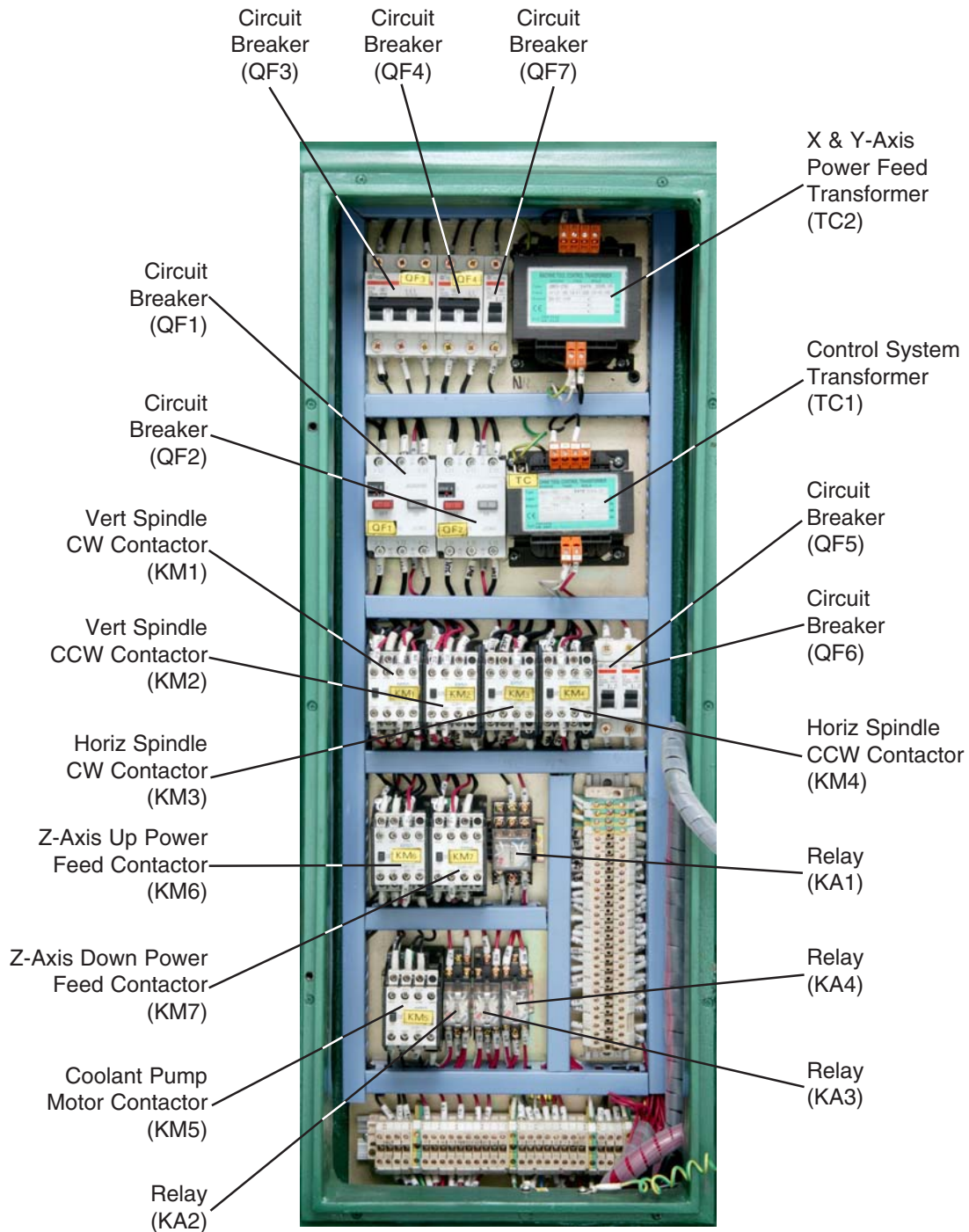


For wiring diagram schematics, refer to Pages 66–68.

To order electrical replacement parts, refer to the Electrical Parts Breakdown & List beginning on Page 122 and Contact Grizzly at (800) 523-4777 or www.grizzly.com.



G0616 Electrical Box Identification

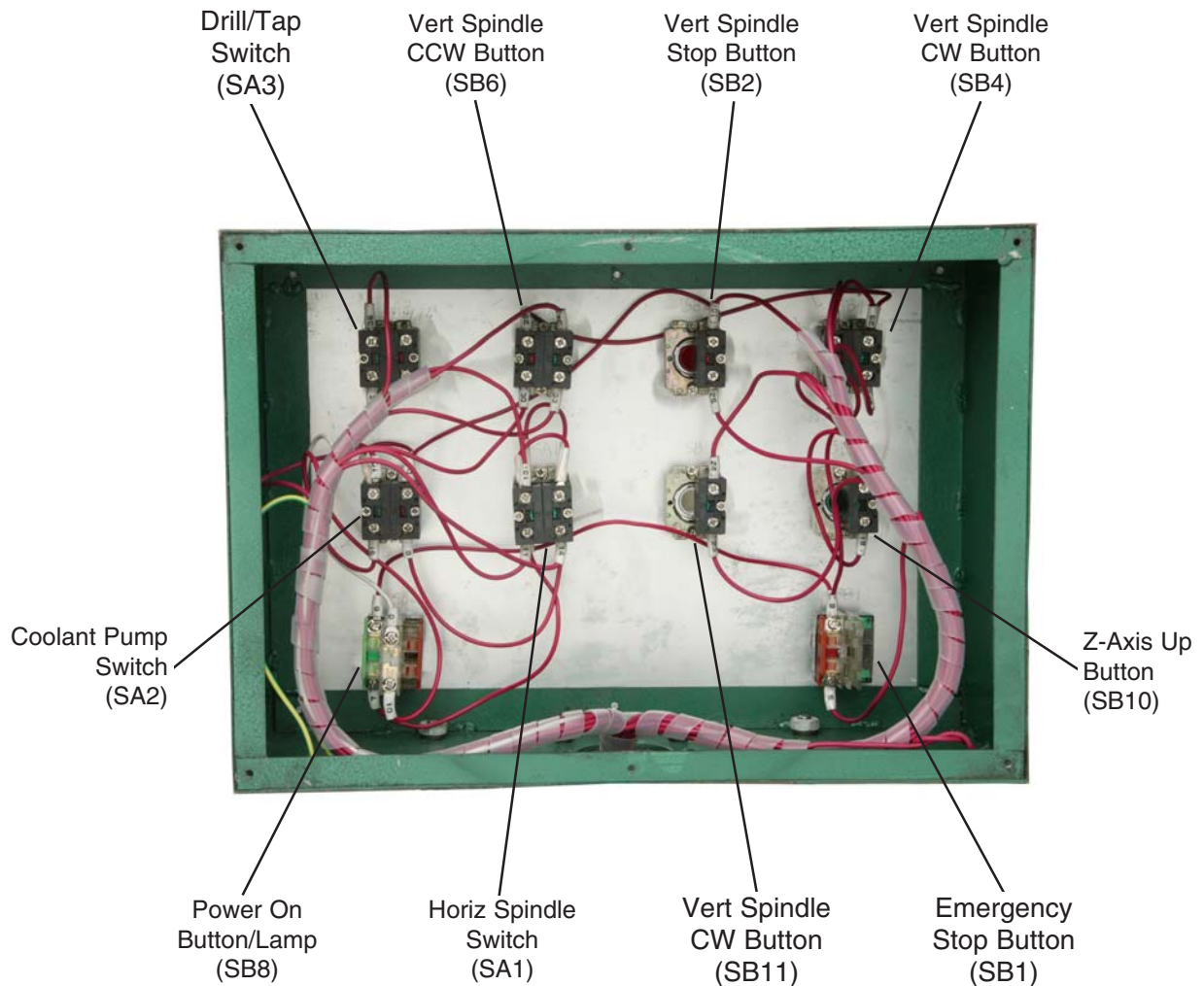


For wiring diagram schematics, refer to Pages 66–68.

To order electrical replacement parts, refer to the Electrical Parts Breakdown & List beginning on Page 122 and Contact Grizzly at (800) 523-4777 or www.grizzly.com.



G0615/G0616 Control Panel Wiring Identification



For wiring diagram schematics, refer to Page 67.

To order electrical replacement parts, refer to the Electrical Parts Breakdown & List beginning on Page 122 and Contact Grizzly at (800) 523-4777 or www.grizzly.com.



G0615/G0616 Electrical Components Wiring Identification (A)

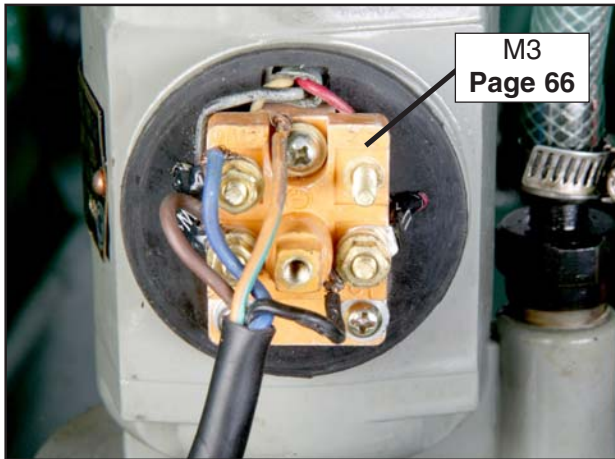


Figure 95. Coolant pump wiring connections.

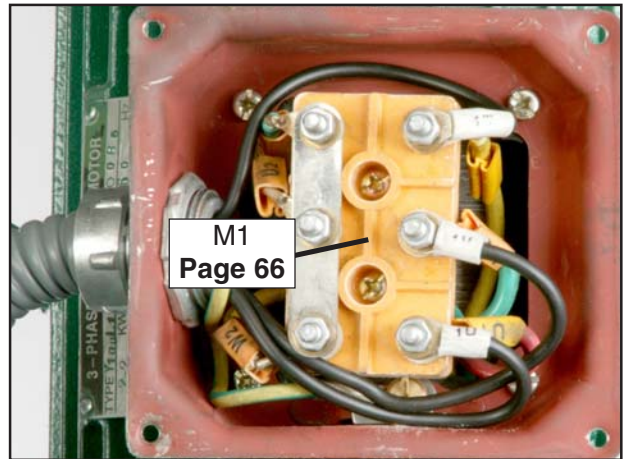


Figure 97. Vertical spindle motor wiring.

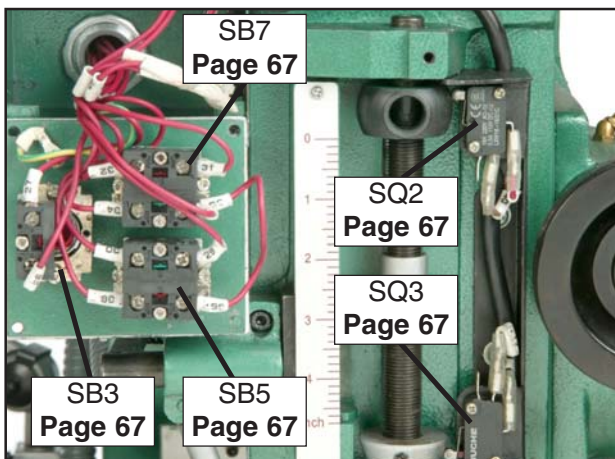


Figure 96. Vertical spindle controls on headstock and auto-downfeed reverse switch wiring.

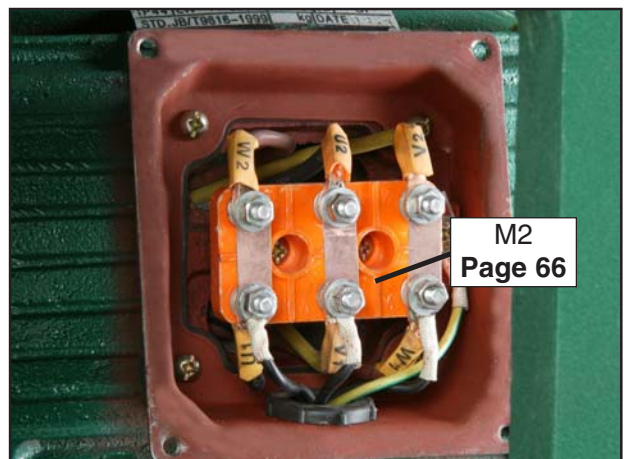


Figure 98. Horizontal spindle motor wiring.



Figure 99. Wiring junction box on right side of knee.



G0615/G0616 Electrical Components Wiring Identification (B)

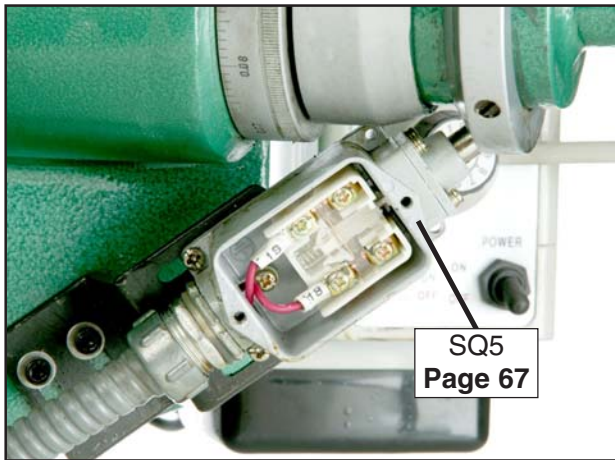


Figure 100. Z-axis crank safety switch wiring.

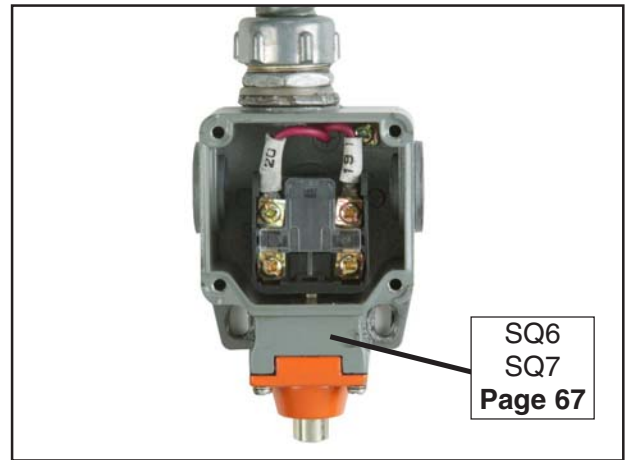


Figure 103. Z-axis limit switch wiring.

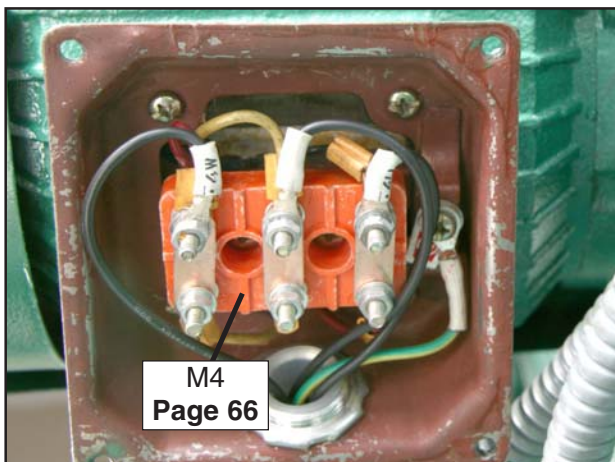


Figure 101. Z-axis power feed motor wiring.



Figure 104. Z-axis lock safety switch wiring.

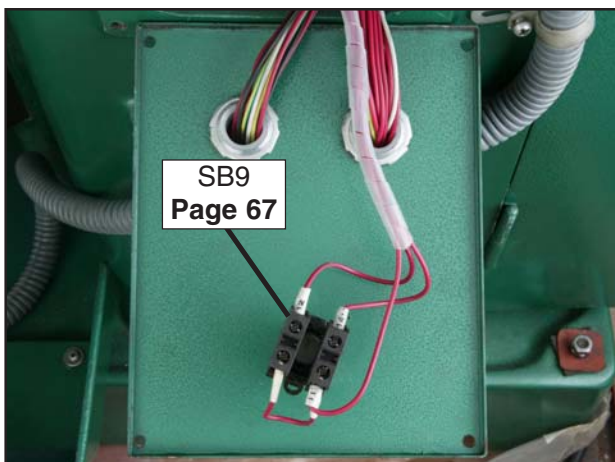


Figure 102. Model G0615 horizontal spindle jog switch wiring.

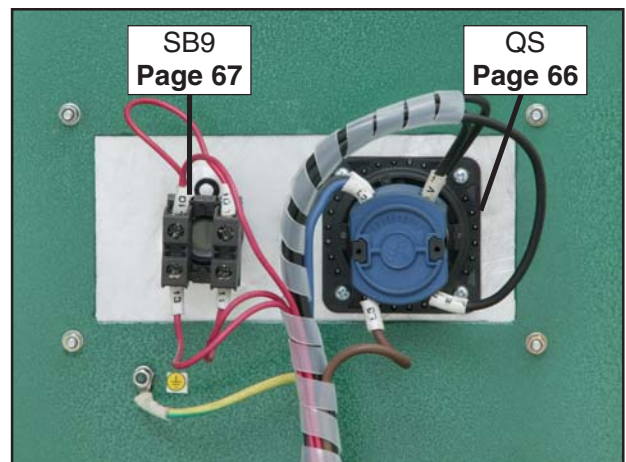


Figure 105. Model G0616 horizontal spindle jog button and main power switch wiring.



G0615/G0616 Power & Motor Connection Wiring Diagram



COLOR CODE

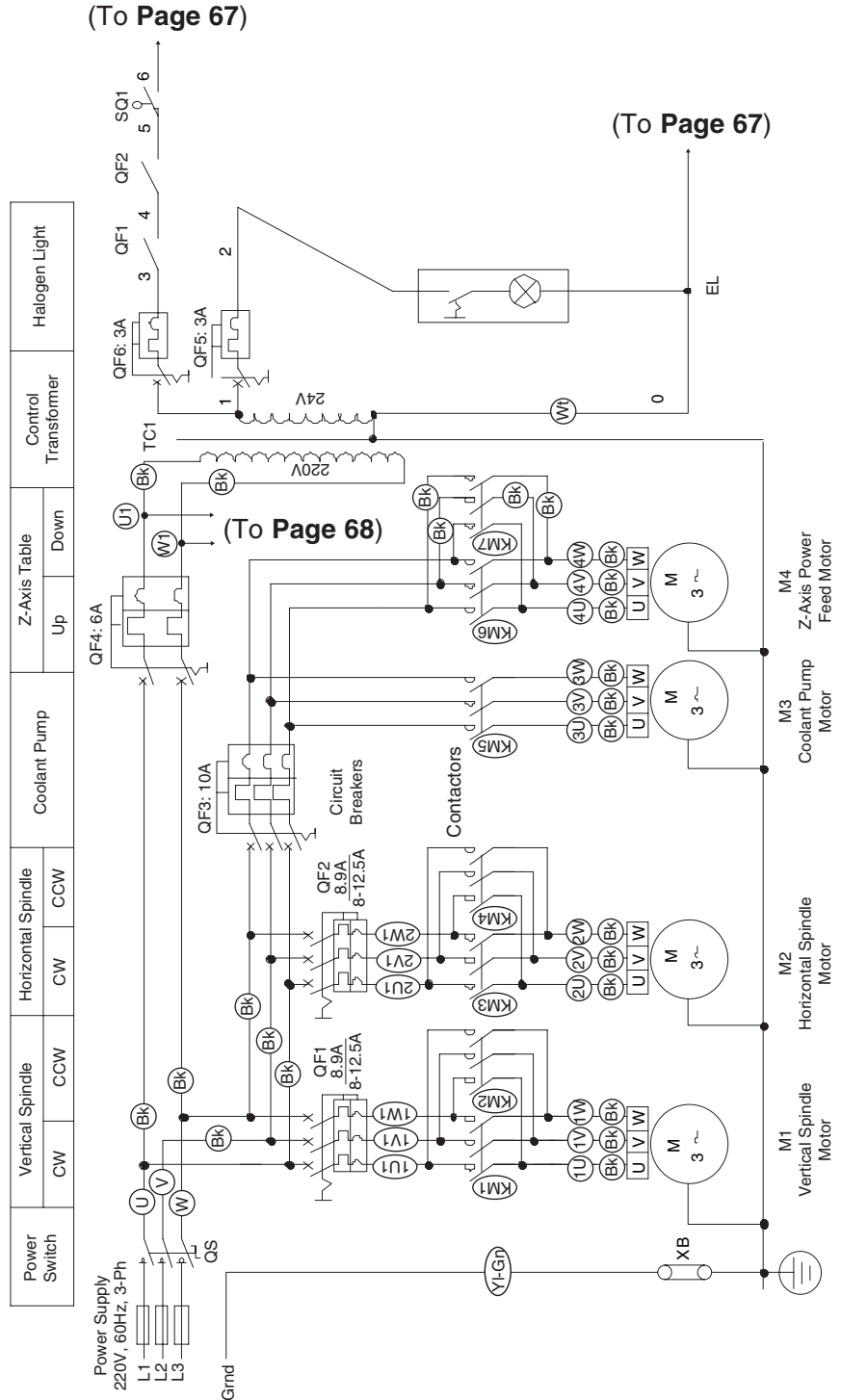
- (Bk) BLACK
- (Wh) WHITE
- (Yl-Gr) YELLOW w/GREEN STRIPE

NOTICE

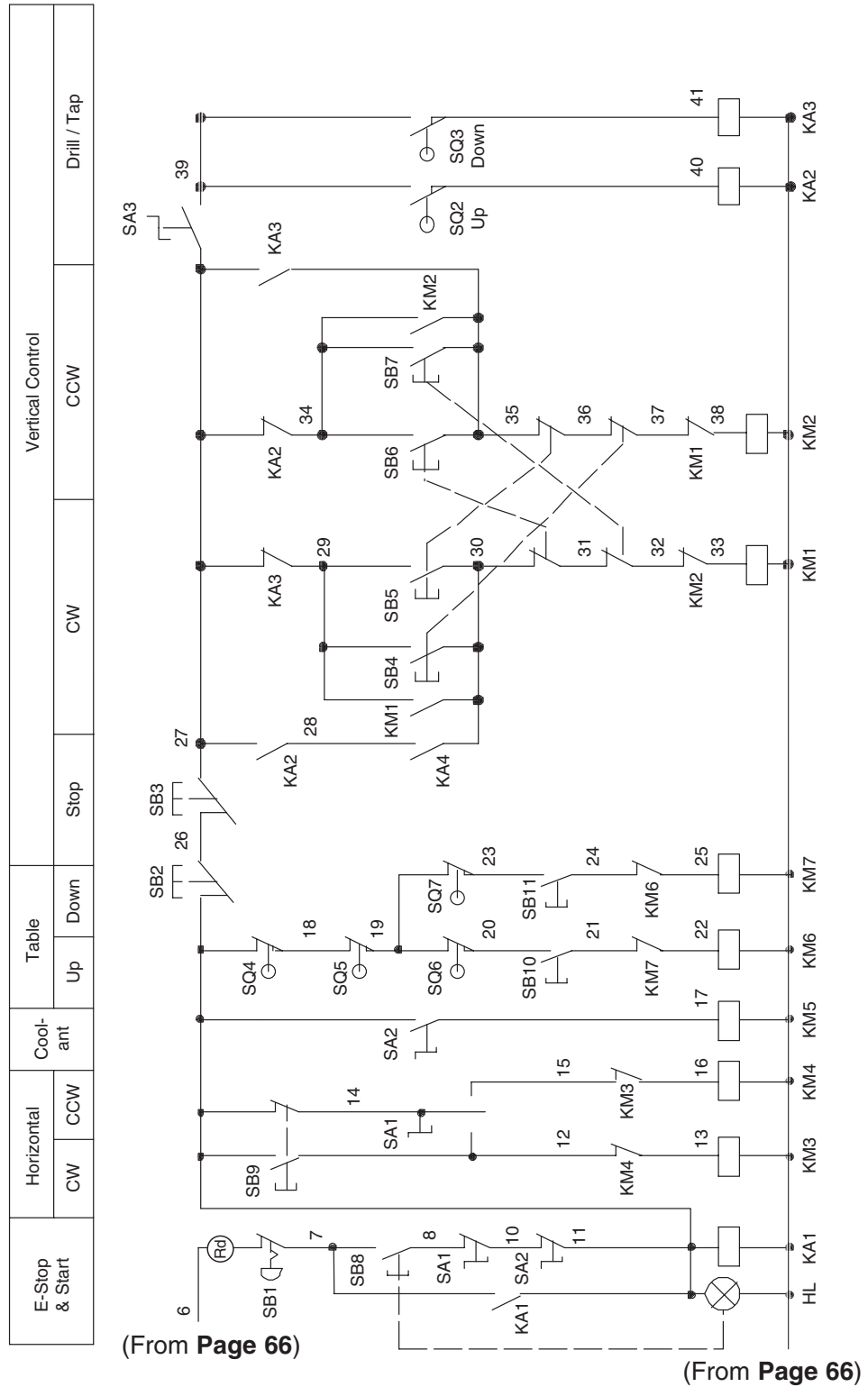
If connecting machine to a phase converter, the manufactured leg must be connected to terminal L2.

NOTICE

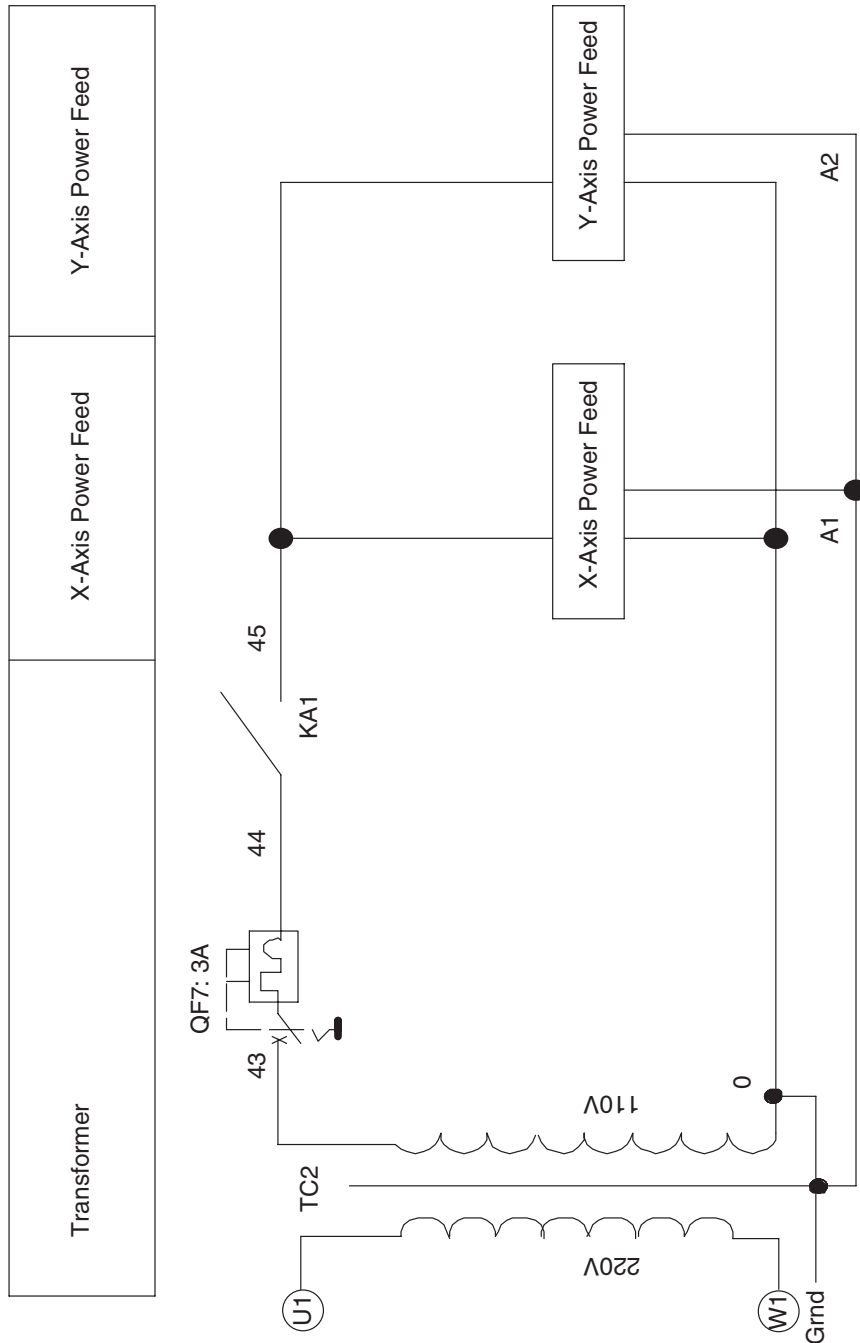
If motor rotates in opposite direction, swap any two power source wires at the incoming terminals.



G0615/G0616 Control Wiring Diagram



G0615/G0616 X & Y-Axis Power Feed Wiring Diagram



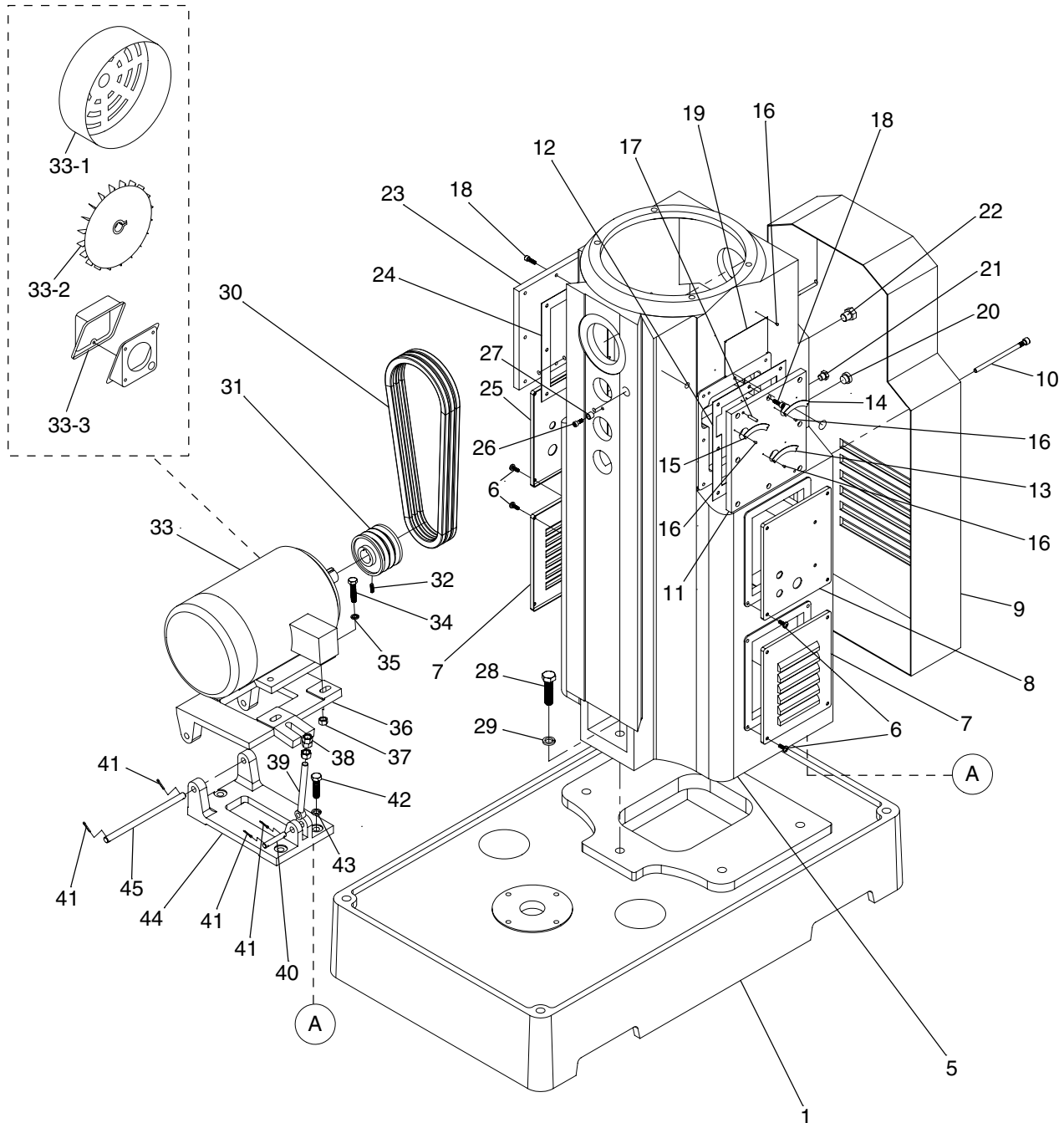
(From Page 66)

(From Page 66)

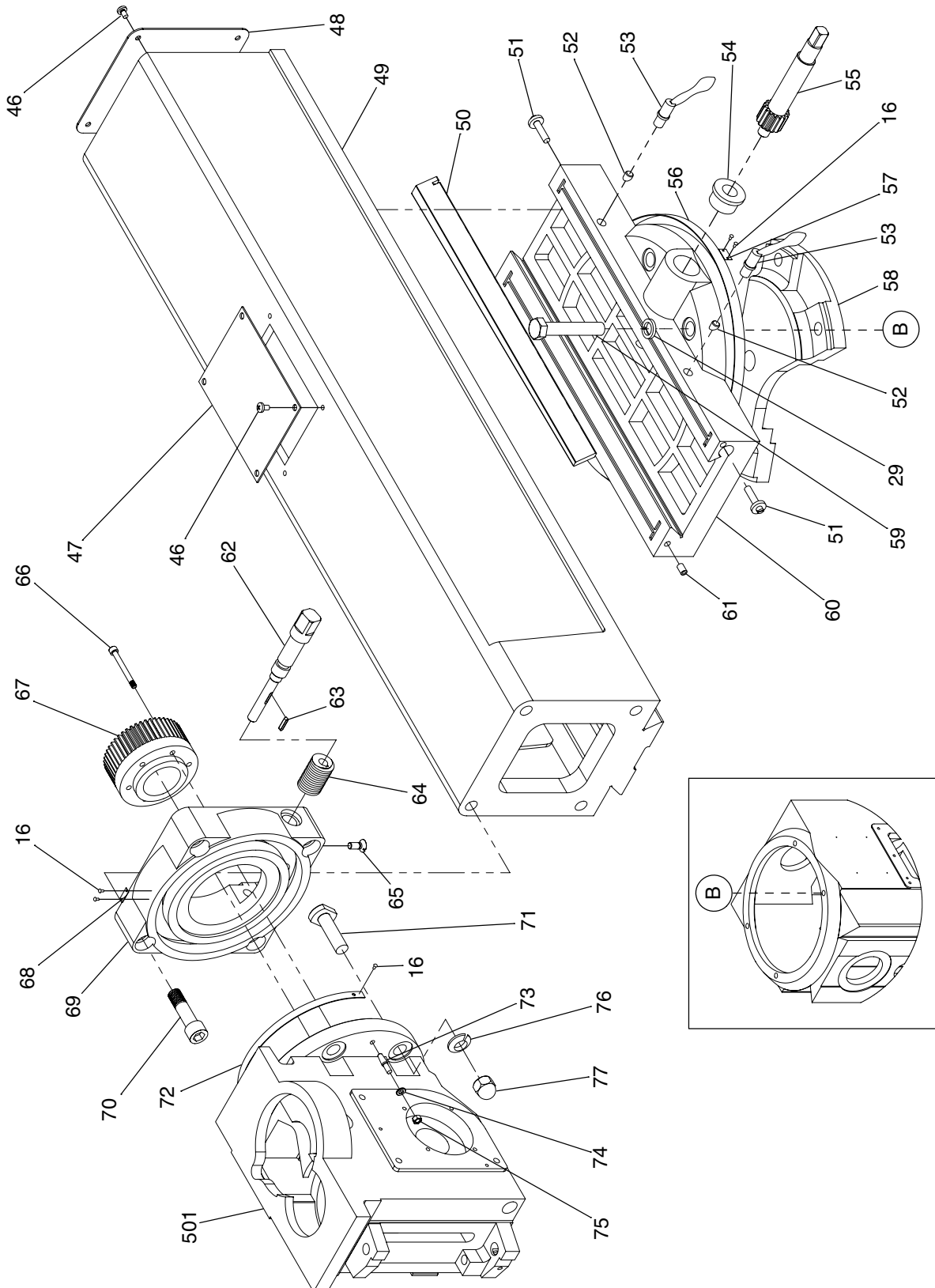


SECTION 9: PARTS

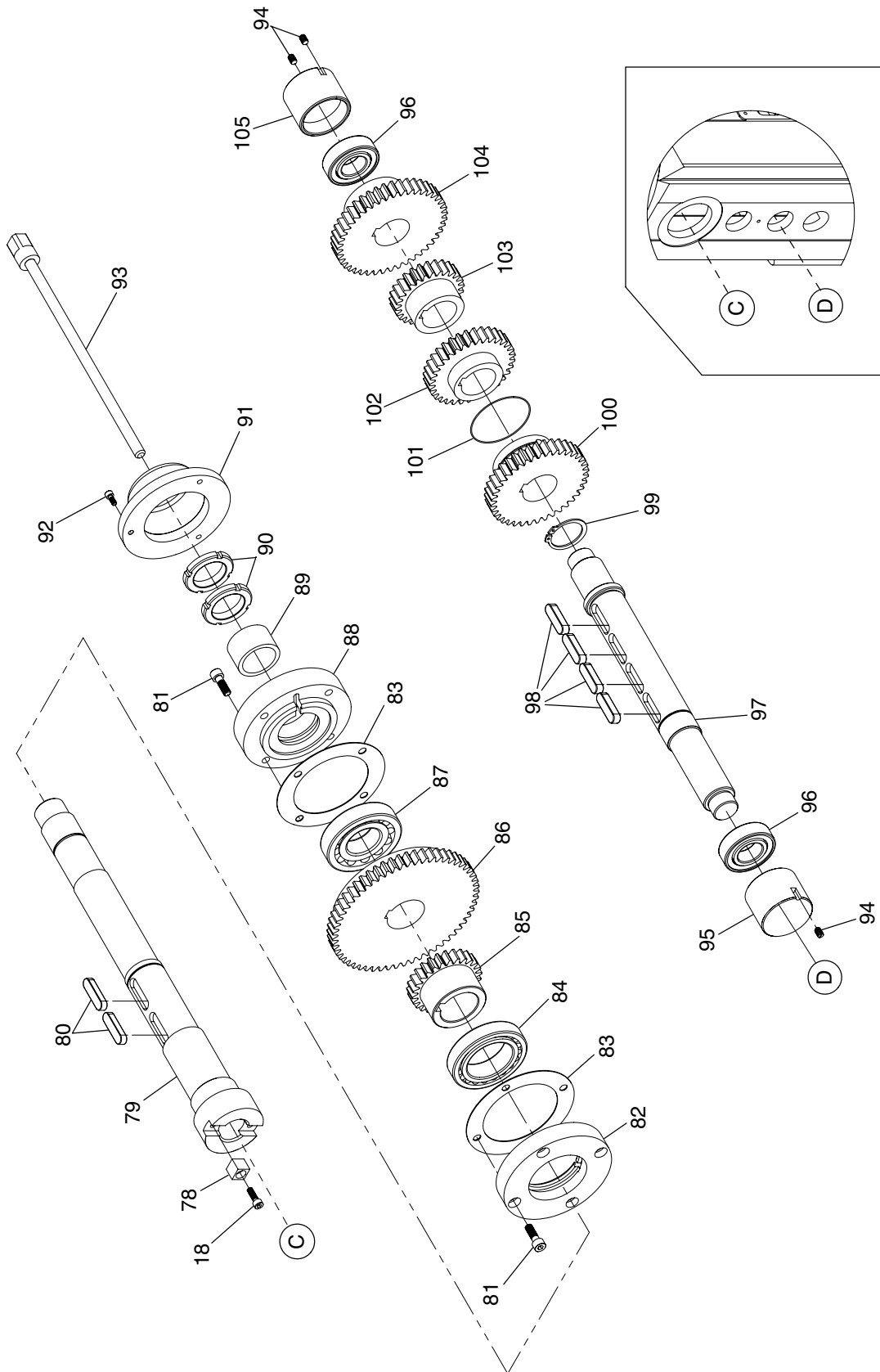
G0615 Base & Column (A)



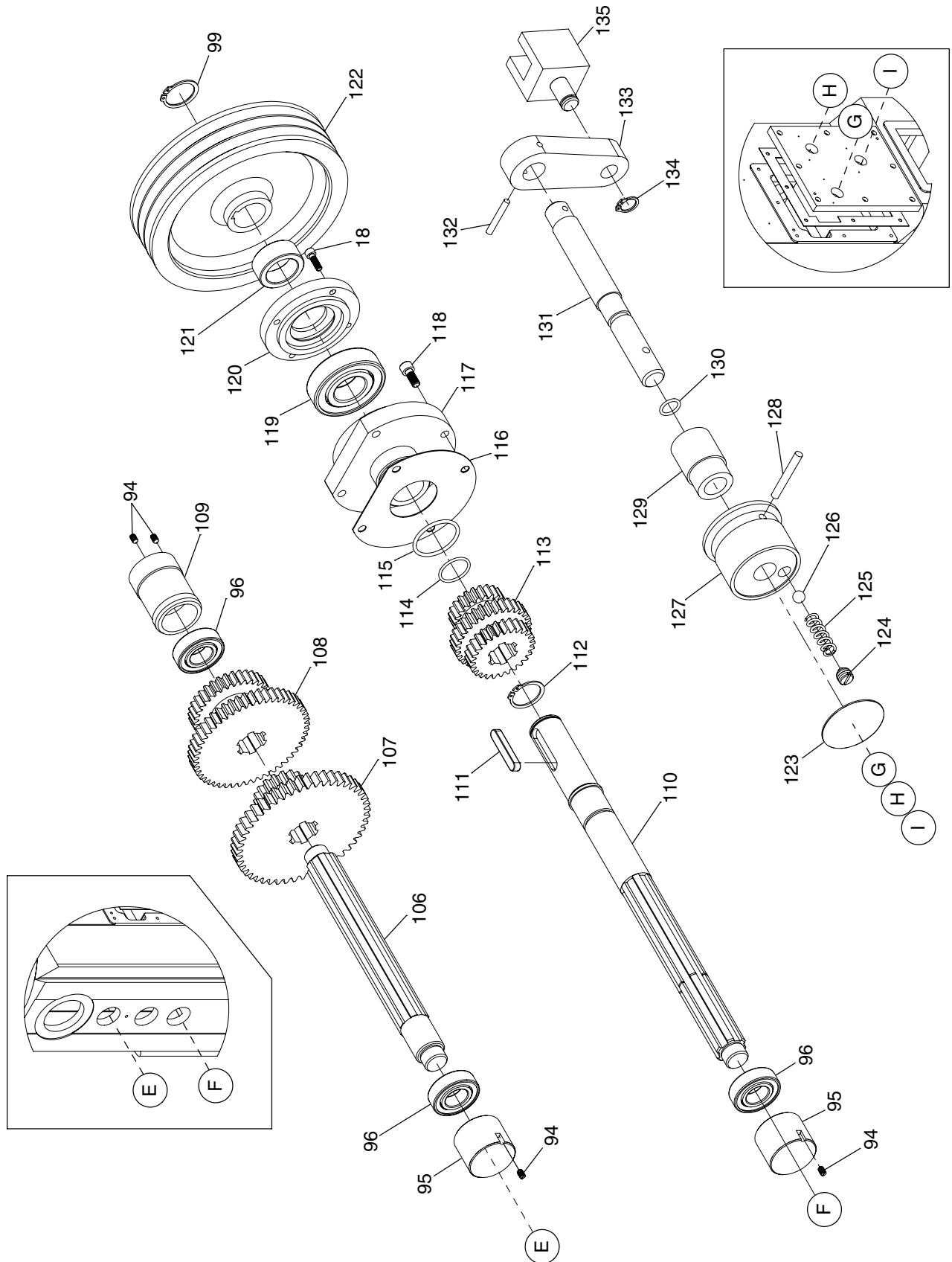
G0615 Base & Column (B)



G0615 Base & Column (C)



G0615 Base & Column (D)



G0615 Base & Column Parts List

REF	PART #	DESCRIPTION
1	P06150001	BASE
5	P06150005	COLUMN
6	PS11M	PHLP HD SCR M6-1 X 16
7	P06150007	COVER
8	P06150008	COVER
9	P06150009	REAR ACCESS PANEL
10	P06150010	KNOB M8-1.25 X 140
11	P06150011	VERTICAL GEAR CHANGE COVER
12	P06150012	GASKET
13	P06150013	INDICATOR PLATE
14	P06150014	INDICATOR PLATE
15	P06150015	INDICATOR PLATE
16	P06150016	RIVET 2.5 X 4
17	P06150017	TAPER PIN 5 X 25
18	PSB02M	CAP SCREW M6-1 X 20
19	P06150019	VERTICAL GEAR CHART
20	P06150020	OIL SIGHT GLASS
21	P06150021	OIL PLUG M10-1 X 8
22	P06150022	OIL PLUG M16-1.5 X 8
23	P06150023	COVER
24	P06150024	GASKET
25	P06150025	COVER
26	PSB01M	CAP SCREW M6-1 X 16
27	P06150027	WAY STOP
28	PB165M	HEX BOLT M16-2 X 60
29	PLW10M	LOCK WASHER 16MM
30	PVA58	V-BELT A-58 4L580
31	P06150031	V-BELT PULLEY
32	PSS06M	SET SCREW M8-1.25 X 16
33	P06150033	MOTOR 3HP/220V/3-PH
33-1	P06150033-1	MOTOR FAN COVER
33-2	P06150033-2	MOTOR FAN
33-3	P06150033-3	MOTOR JUNCTION BOX
34	PB116M	HEX BOLT M10-1.5 X 45
35	PLW06M	LOCK WASHER 10MM
36	P06150036	MOTOR MOUNT PLATE
37	PN02M	HEX NUT M10-1.5
38	PN09M	HEX NUT M12-1.75
39	P06150039	ADJUSTING BOLT
40	P06150040	SHAFT
41	P06150041	COTTER PIN 2.5 X 16
42	PB24M	HEX BOLT M12-1.75 X 45
43	PLW05M	LOCK WASHER 12MM
44	P06150044	MOTOR BASE PLATE
45	P06150045	SHAFT
46	PS68M	PLPH HD SCR M6-1 X 10
47	P06150047	COVER
48	P06150048	COVER
49	P06150049	RAM
50	P06150050	RAM GIB

REF	PART #	DESCRIPTION
51	P06150051	GIB ADJUSTING SCREW
52	P06150052	LOCK BUSHING
53	P06150053	HANDLE
54	P06150054	BUSHING
55	P06150055	GEAR SHAFT
56	P06150056	GRADUATED SCALE
57	P06150057	INDICATOR PLATE
58	P06150058	MOUNTING PLATE
59	PB133M	HEX BOLT M16-2 X 90
60	P06150060	RAM BASE
61	P06150061	BALL OILER
62	P06150062	SHAFT
63	PK48M	KEY 4 X 4 X 20
64	P06150064	WORM GEAR
65	P06150065	LOCATING SCREW
66	PSB49M	CAP SCREW M6-1 X 60
67	P06150067	GEAR
68	P06150068	INDICATOR PLATE
69	P06150069	HEADSTOCK MOUNTING PLATE
70	PSB123M	CAP SCREW M16-2 X 60
71	P06150071	T-BOLT
72	P06150072	GRADUATED SCALE
73	P06150073	SPECIAL BOLT
74	PW03M	FLAT WASHER 6MM
75	PN01M	HEX NUT M6-1
76	PLW10M	LOCK WASHER 16MM
77	PN19M	ACORN NUT M16-2
78	P06150078	SQUARE KEY
79	P06150079	HORIZONTAL SPINDLE
80	PK137M	KEY 12 X 12 X 45
81	PSB31M	CAP SCREW M8-1.25 X 25
82	P06150082	END COVER
83	P06150083	GASKET
84	P32011	BALL BEARING 32011
85	P06150085	GEAR 26T
86	P06150086	GEAR 57T
87	P06150087	BALL BEARING 30308E
88	P06150088	END COVER
89	P06150089	BUSHING
90	P06150090	SPANNER NUT
91	P06150091	COVER
92	PSB33M	CAP SCREW M5-.8 X 12
93	P06150093	HORIZONTAL SPINDLE DRAWBAR
94	PSS01M	SET SCREW M6-1 X 10
95	P06150095	PLUG
96	P6205	BALL BEARING 6205
97	P06150097	SHAFT
98	PK138M	KEY 10 X 10 X 36
99	PR12M	EXT RETAINING RING 35MM
100	P06150100	GEAR 38T



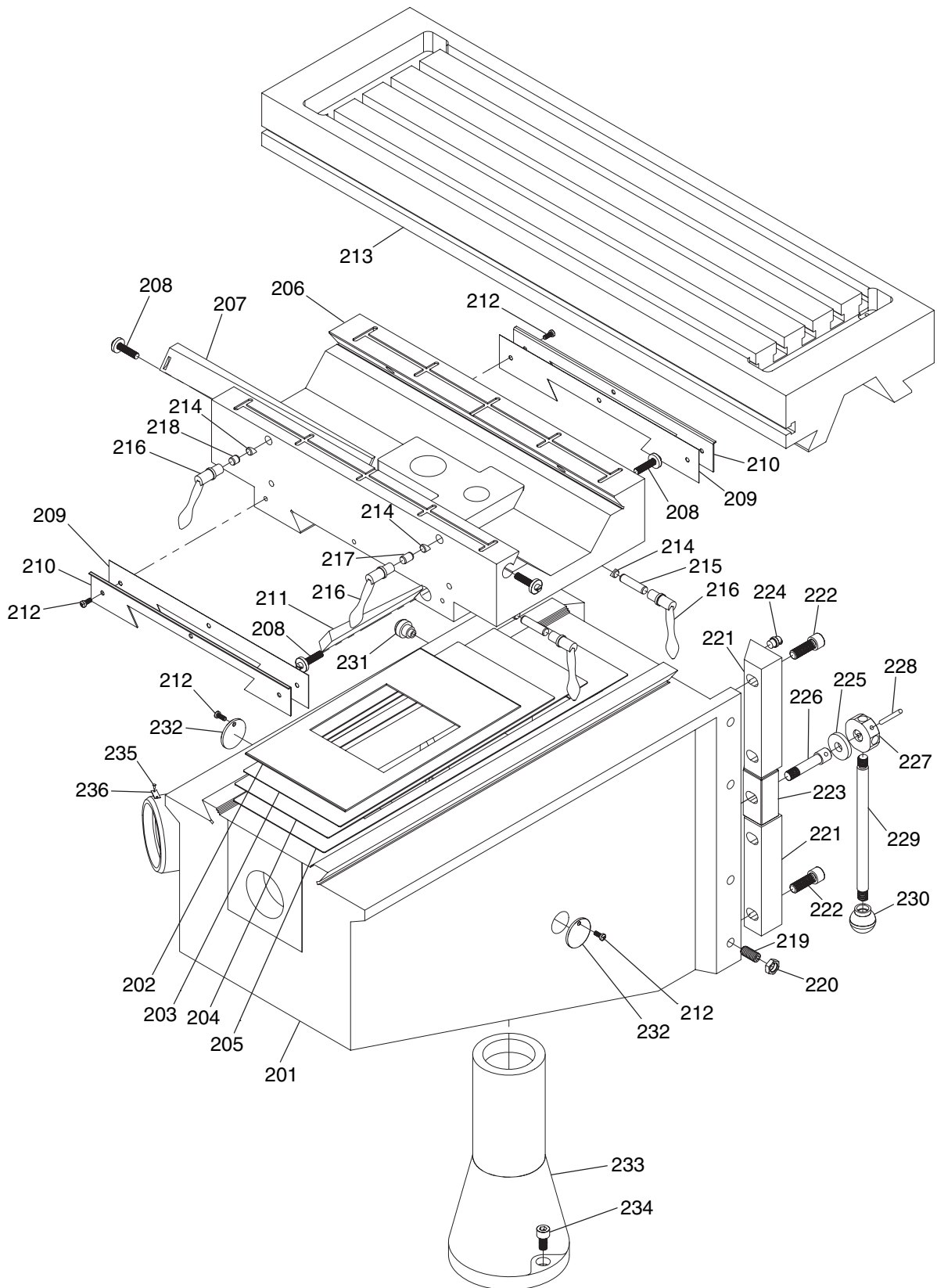
G0615 Base & Column Parts List

REF	PART #	DESCRIPTION
101	P06150101	SPECIAL RETAINER
102	P06150102	GEAR 33T
103	P06150103	GEAR 26T
104	P06150104	GEAR 43T
105	P06150105	PLUG
106	P06150106	SPLINE SHAFT
107	P06150107	GEAR 48/17T
108	P06150108	GEAR 50/33T
109	P06150109	PLUG
110	P06150110	SPLINE SHAFT
111	PK123M	KEY 10 X 10 X 55
112	PR84M	EXT RETAINING RING 34MM
113	P06150113	GEAR 27/32/22T
114	P06150114	O-RING 30 X 2.65
115	P06150115	O-RING 45 X 3.55
116	P06150116	GASKET
117	P06150117	FLANGE
118	PSB14M	CAP SCREW M8-1.25 X 20

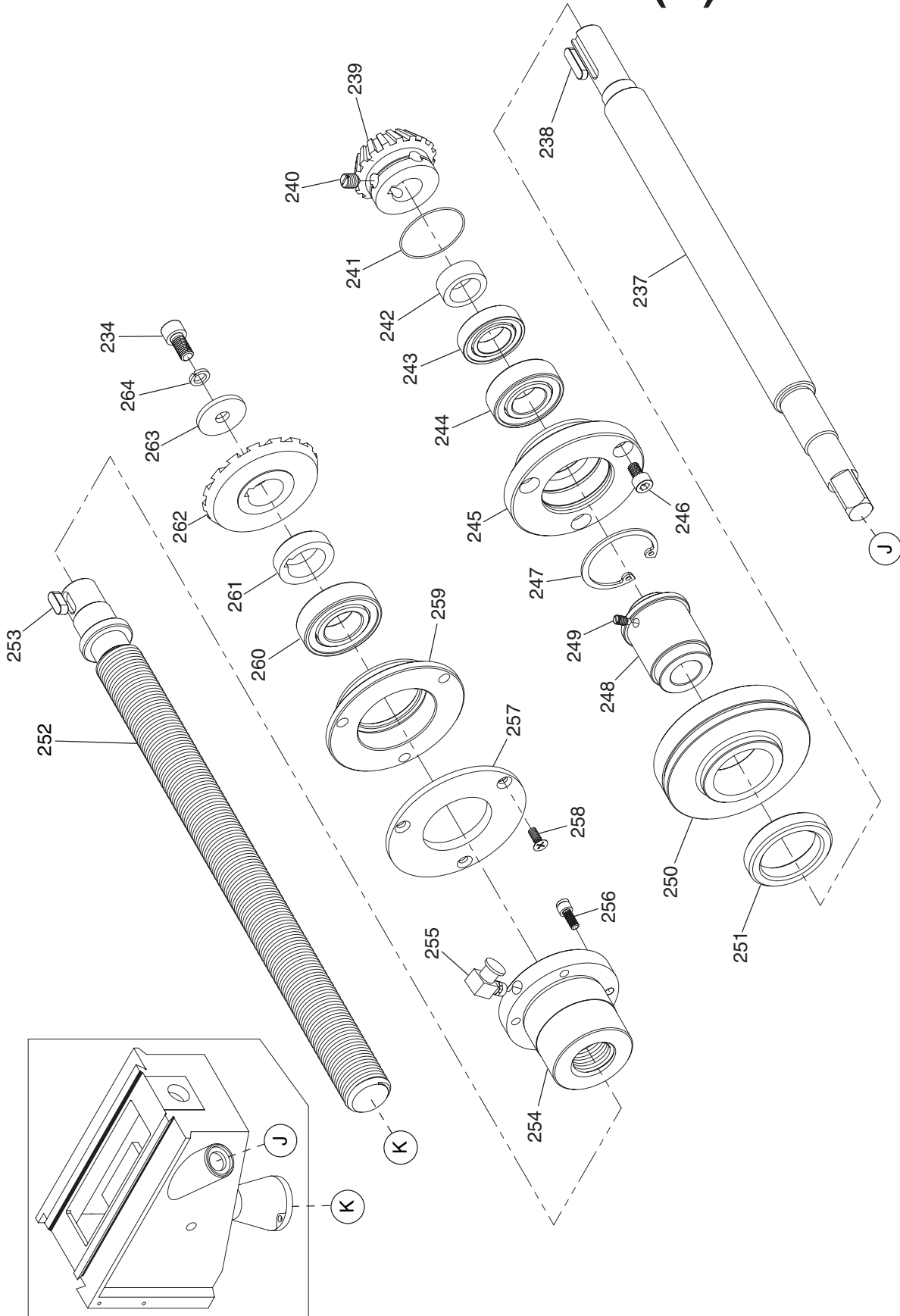
REF	PART #	DESCRIPTION
119	P06150119	BALL BEARING 6307
120	P06150120	COVER
121	P06150121	BUSHING
122	P06150122	V-BELT PULLEY
123	P06150123	INDICATOR PLATE
124	PSS30M	SET SCREW M10-1.5 X 10
125	P06150125	COMPRESSION SPRING
126	P06150126	STEEL BALL 8MM
127	P06150127	HANDLE BASE
128	P06150128	TAPER PIN 4 X 30
129	P06150129	BUSHING
130	P06150130	O-RING 11.2 X 2.65
131	P06150131	SHAFT
132	P06150132	TAPER PIN 4 X 30
133	P06150133	ROCKER ARM
134	PR03M	EXT RETAINING RING 12MM
135	P06150135	SHIFTING FORK
501	P06150501	HEADSTOCK



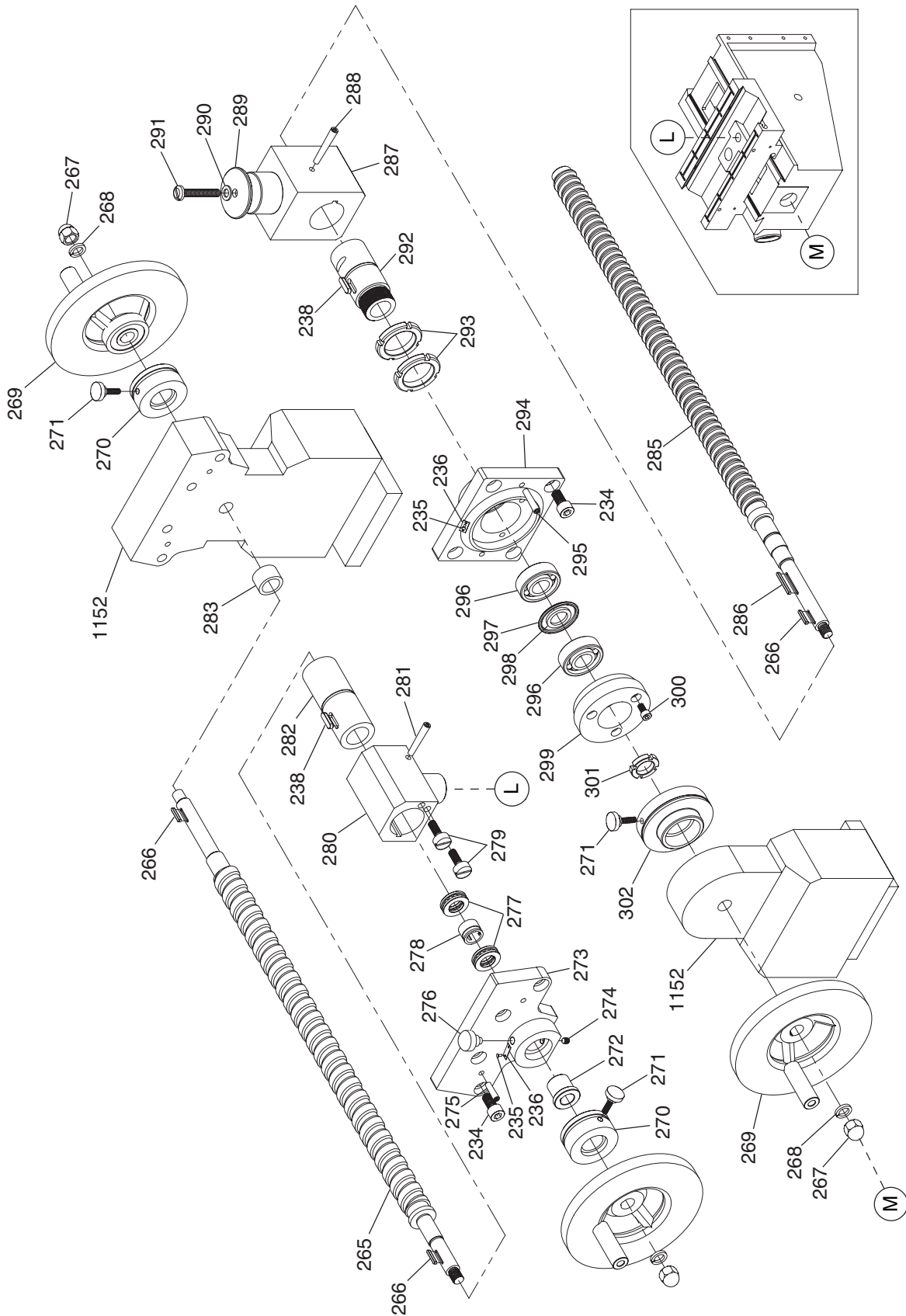
G0615 Table & Knee (A)



G0615 Table & Knee (B)



G0615 Table & Knee (C)



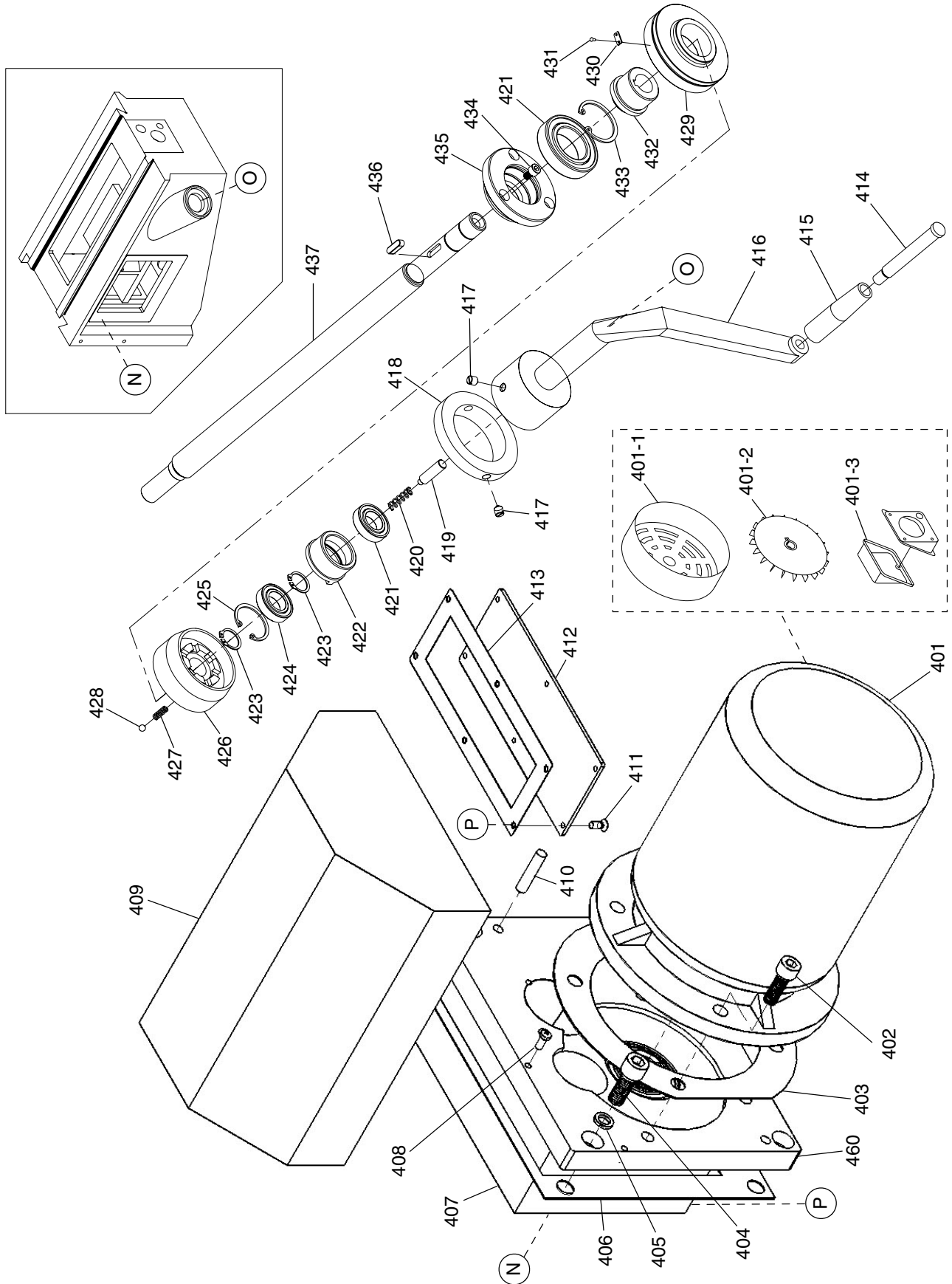
G0615 Table & Knee Parts List

REF	PART #	DESCRIPTION
201	P06150201	KNEE
202	P06150202	WAY SLIDE SMALL
203	P06150203	WAY SLIDE MEDIUM
204	P06150204	WAY SLIDE LARGE
205	P06150205	WAY SLIDE BASE
206	P06150206	SADDLE
207	P06150207	LONGITUDINAL GIB
208	P06150208	GIB ADJUSTING SCREW
209	P06150209	FELT GASKET
210	P06150210	WIPER COVER
211	P06150211	CROSS GIB
212	PS08M	PHLP HD SCR M5-.8 X 12
213	P06150213	TABLE
214	P06150214	LOCK BUSHING
215	P06150215	LOCK HANDLE PIN 10 X 40
216	P06150216	LOCK HANDLE
217	P06150217	LOCK HANDLE PIN 10 X 15
218	P06150218	LOCK HANDLE PIN 10 X 10
219	PSS78M	SET SCREW M12-1.75 X 25
220	PN09M	HEX NUT M12-1.75
221	P06150221	KNEE GIB LONG
222	PSB111M	CAP SCREW M12-1.75 X 35
223	P06150223	KNEE GIB SHORT
224	P06150224	GREASE FITTING
225	P06150225	SPECIAL FLAT WASHER
226	P06150226	SPECIAL SCREW
227	P06150227	LOCK SLEEVE
228	P06150228	TAPER PIN 5 X 50
229	P06150229	LOCK HANDLE
230	P06150230	BALL KNOB
231	P06150231	BALL OILER
232	P06150232	COVER
233	P06150233	KNEE COLUMN
234	PSB61M	CAP SCREW M10-1.5 X 20
235	P06150235	RIVET 2 X 5
236	P06150236	INDICATOR PLATE
237	P06150237	SHAFT
238	PK139M	KEY 6 X 6 X 22
239	P06150239	BEVEL GEAR 18T
240	PSS16M	SET SCREW M8-1.25 X 10
241	P06150241	O-RING 1 X 125
242	P06150242	BUSHING
243	P06150243	BALL BEARING 61904
244	P6004	BALL BEARING 6004ZZ
245	P06150245	BEARING HOUSING
246	PSB04M	CAP SCREW M6-1 X 10
247	PR24M	INT RETAINING RING 42MM
248	P06150248	THREADED BUSHING
249	PSS05M	SET SCREW M5-.8 X 10
250	P06150250	GRADUATED DIAL
251	P06150251	COLLAR

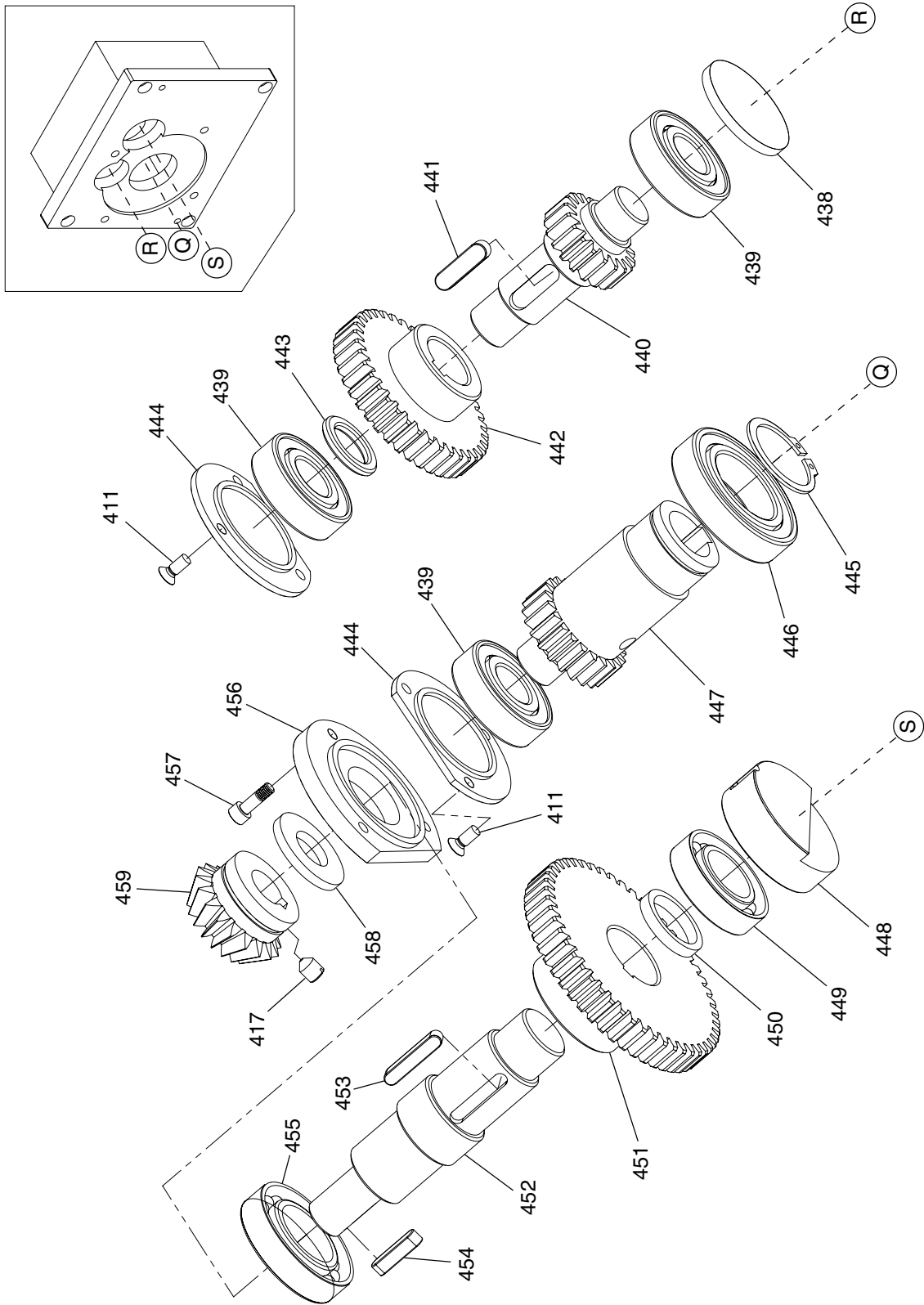
REF	PART #	DESCRIPTION
252	P06150252	KNEE LEAD SCREW
253	PK107M	KEY 8 X 8 X 20
254	P06150254	THREADED RETAINER
255	P06150255	GREASE FITTING
256	PSB01M	CAP SCREW M6-1 X 16
257	P06150257	BEARING RETAINER RING
258	PFH38M	FLAT HD SCR M6-1 X 16
259	P06150259	BEARING HOUSING
260	P6206	BALL BEARING 6206ZZ
261	P06150261	BUSHING
262	P06150262	BEVEL GEAR 36T
263	P06150263	SPECIAL WASHER
264	PLW06M	LOCK WASHER 10MM
265	P06150265	LONGITUDINAL LEAD SCREW
266	PK140M	KEY 3 X 3 X 20
267	PN45M	ACORN NUT M12-1.75
268	PLW05M	LOCK WASHER 12MM
269	P06150269	HANDWHEEL
270	P06150270	GRADUATED DIAL
271	P06150271	KNURLED SCREW
272	P06150272	BUSHING
273	P06150273	BRACKET
274	PSS03M	SET SCREW M6-1 X 8
275	P06150275	TAPER PIN 6 X 24
276	P06150276	BALL OILER
277	P51103	THRUST BEARING 51103
278	P06150278	BUSHING
279	P06150279	SPECIAL SCREW
280	P06150280	BEARING HOUSING
281	P06150281	TAPER PIN 6 X 45
282	P06150282	BUSHING
283	P06150283	BUSHING
285	P06150285	CROSS LEAD SCREW
286	PK141M	KEY 3 X 3 X 32
287	P06150287	BEARING HOUSING
288	P06150288	TAPER PIN 6 X 50
289	P06150289	CAP
290	PLW04M	LOCK WASHER 8MM
291	P06150291	FLANGE SCREW M8-1.25 X 50
292	P06150292	THREADED BUSHING
293	P06150293	SPANNER NUT
294	P06150294	BRACKET
295	P06150295	TAPER PIN 6 X 32
296	P06150296	ANG CONTACT BEARING 7204C
297	P06150297	SPECIAL WASHER
298	P06150298	SPECIAL WASHER
299	P06150299	RETAINER
300	PSB26M	CAP SCREW M6-1 X 12
301	P06150301	SPANNER NUT
302	P06150302	GRADUATED DIAL
1152	P06151152	POWER FEED ASSEMBLY



G0615 Z-Axis Power Lift (A)



G0615 Z-Axis Power Lift (B)



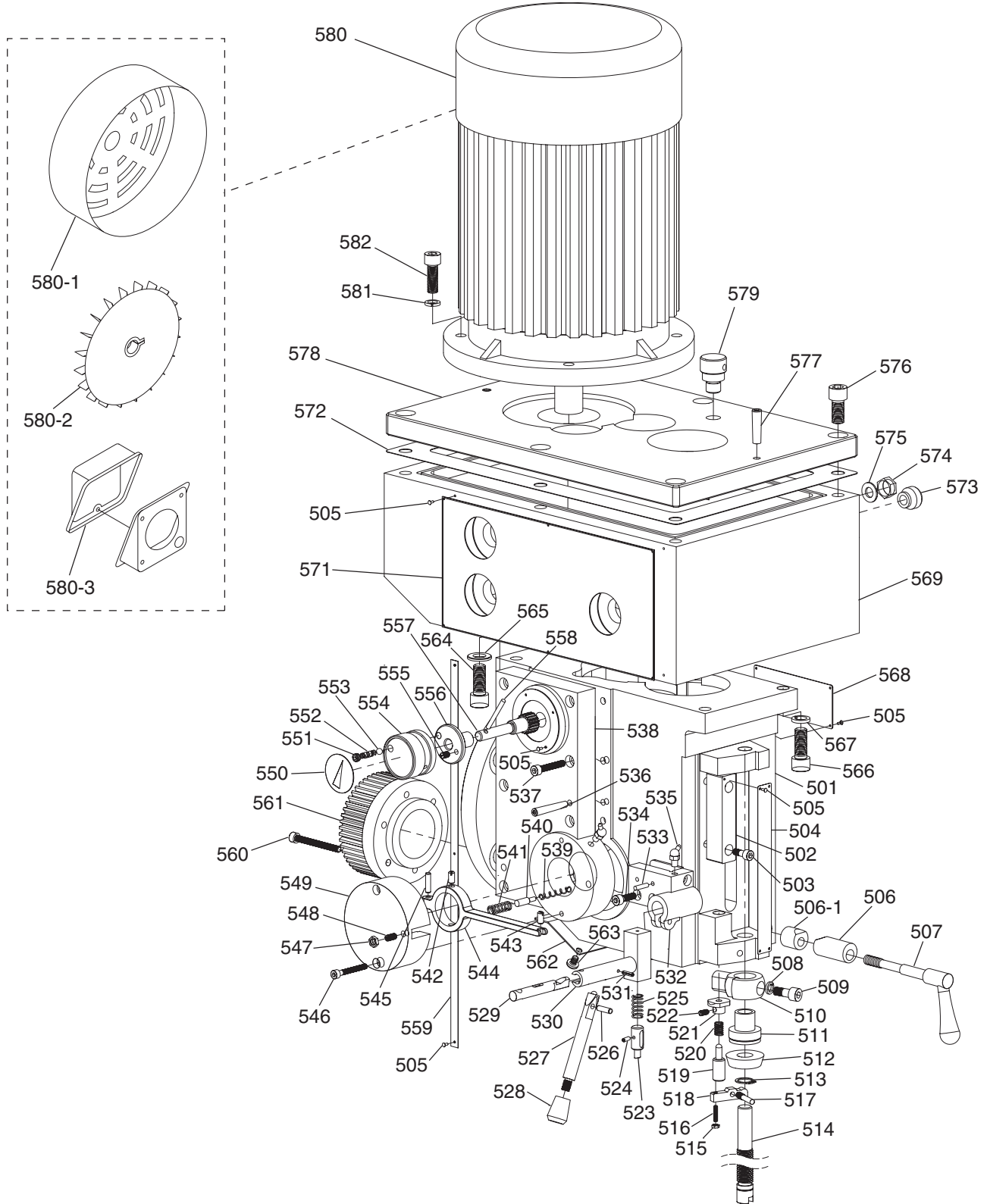
G0615 Z-Axis Power Lift Parts List

REF	PART #	DESCRIPTION
401	P06150401	MOTOR 1HP/220V/3PH
401-1	P06150401-1	MOTOR FAN COVER
401-2	P06150401-2	MOTOR FAN
401-3	P06150401-3	MOTOR JUNCTION BOX
402	PSB72M	CAP SCREW M10-1.5 X 30
403	P06150403	GASKET
404	PSB77M	CAP SCREW M12-1.75 X 30
405	PLW05M	LOCK WASHER 12MM
406	P06150406	GASKET
407	P06150407	BRACKET
408	PS08M	PHLP HD SCR M5-.8 X 12
409	P06150409	MOTOR COVER
410	P06150410	TAPER PIN 8 X 40
411	PS08M	PHLP HD SCR M5-.8 X 12
412	P06150412	COVER
413	P06150413	GASKET
414	P06150414	HANDLE
415	P06150415	HANDLE BUSHING
416	P06150416	CRANK
417	PSS16M	SET SCREW M8-1.25 X 10
418	P06150418	ADAPTER RING
419	P06150419	SHAFT
420	P06150420	COMPRESSION SPRING
421	P6004	BALL BEARING 6004ZZ
422	P06150422	LOCKING BUSHING
423	PR09M	EXT RETAINING RING 20MM
424	P06150424	BALL BEARING 61904
425	PR85M	INT RETAINING RING 37MM
426	P06150426	CLUTCH
427	P06150427	COMPRESSION SPRING
428	P06150428	STEEL BALL 6MM
429	P06150429	GRADUATED DIAL

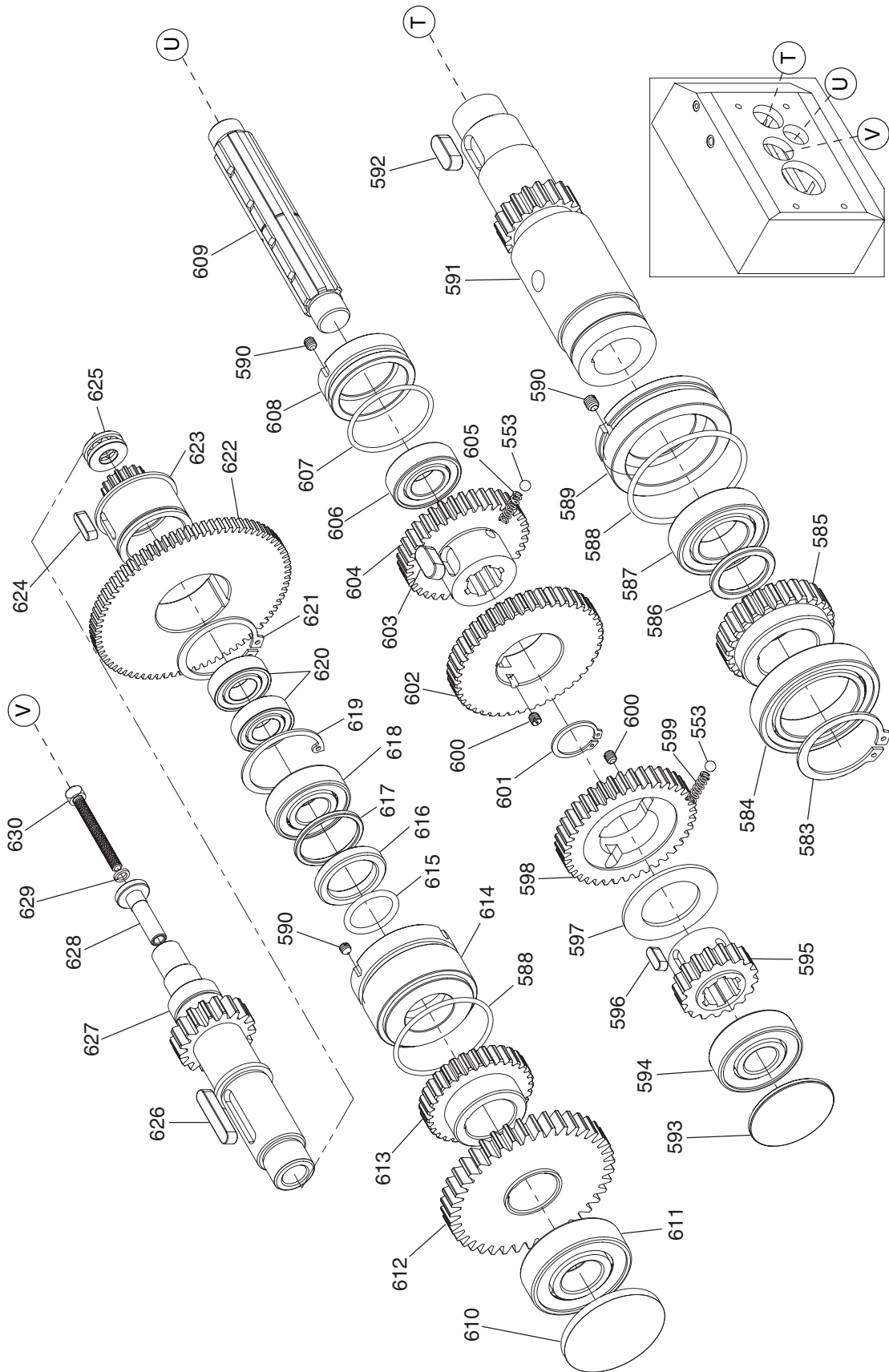
REF	PART #	DESCRIPTION
430	P06150430	INDICATOR PLATE
431	P06150431	RIVET 2 X 4
432	P06150432	BUSHING
433	PR24M	INT RETAINING RING 42MM
434	PSB04M	CAP SCREW M6-1 X 10
435	P06150435	BEARING HOUSING
436	PK07M	KEY 6 X 6 X 20
437	P06150437	SHAFT
438	P06150438	COVER
439	P6204	BALL BEARING 6204ZZ
440	P06150440	GEAR SHAFT 19T
441	P06150441	KEY 8 X 7 X 28
442	P06150442	GEAR 38T
443	P06150443	COLLAR
444	P06150444	COVER
445	PR12M	EXT RETAINING RING 35MM
446	P6007	BALL BEARING 6007ZZ
447	P06150447	GEAR SHAFT 22T
448	P06150448	PLUG
449	P06150449	ANG CONTACT BEARING 7005C
450	P06150450	SPACER
451	P06150451	GEAR 50T
452	P06150452	SHAFT
453	PK142M	KEY 6 X 6 X 32
454	PK143M	KEY 6 X 6 X 25
455	P6006	BALL BEARING 6006ZZ
456	P06150456	COVER
457	PSB24M	CAP SCREW M5-.8 X 16
458	P06150458	SPECIAL WASHER
459	P06150459	BEVEL GEAR 18T
460	P06150460	MOTOR MOUNTING BRACKET



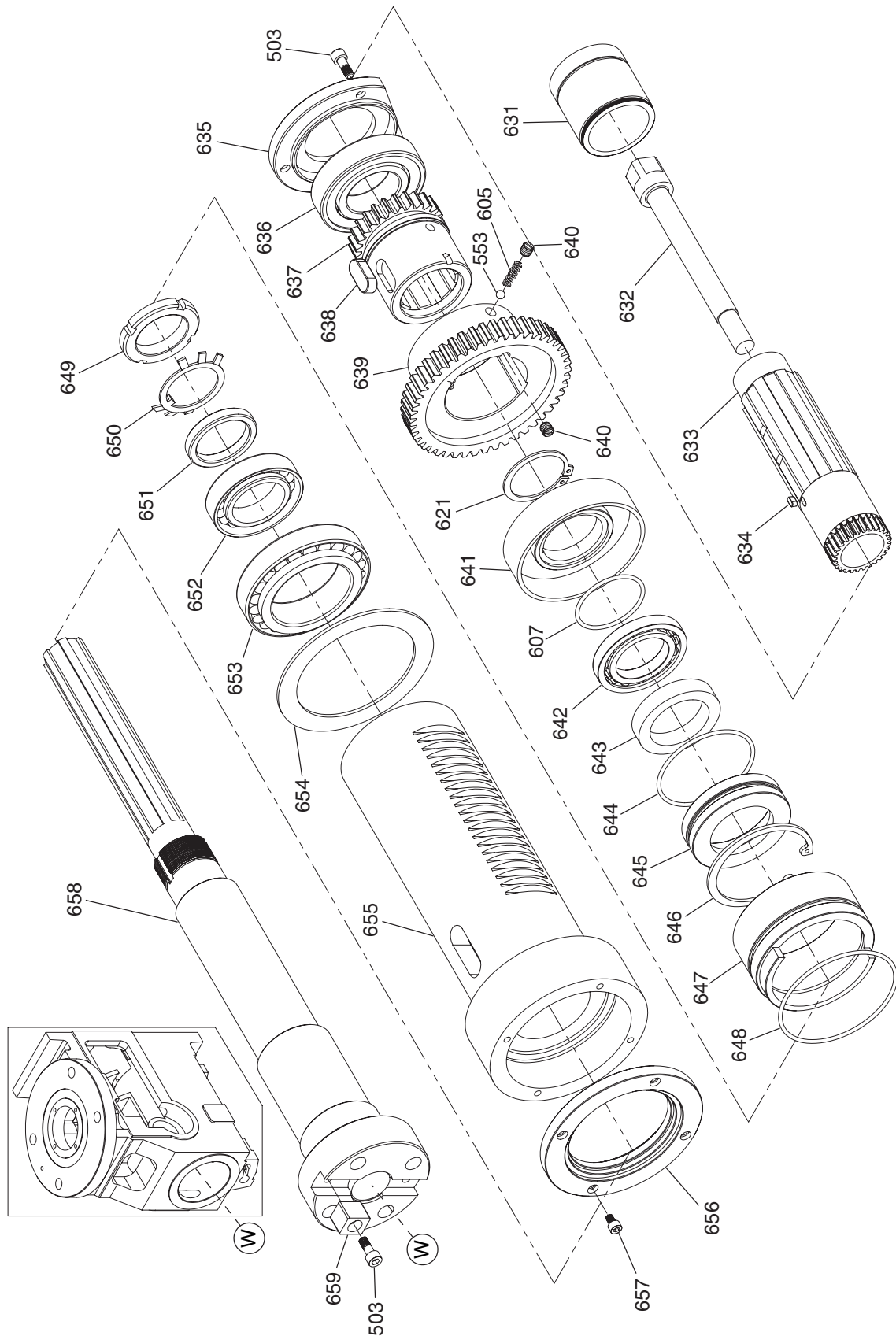
G0615 Head (A)



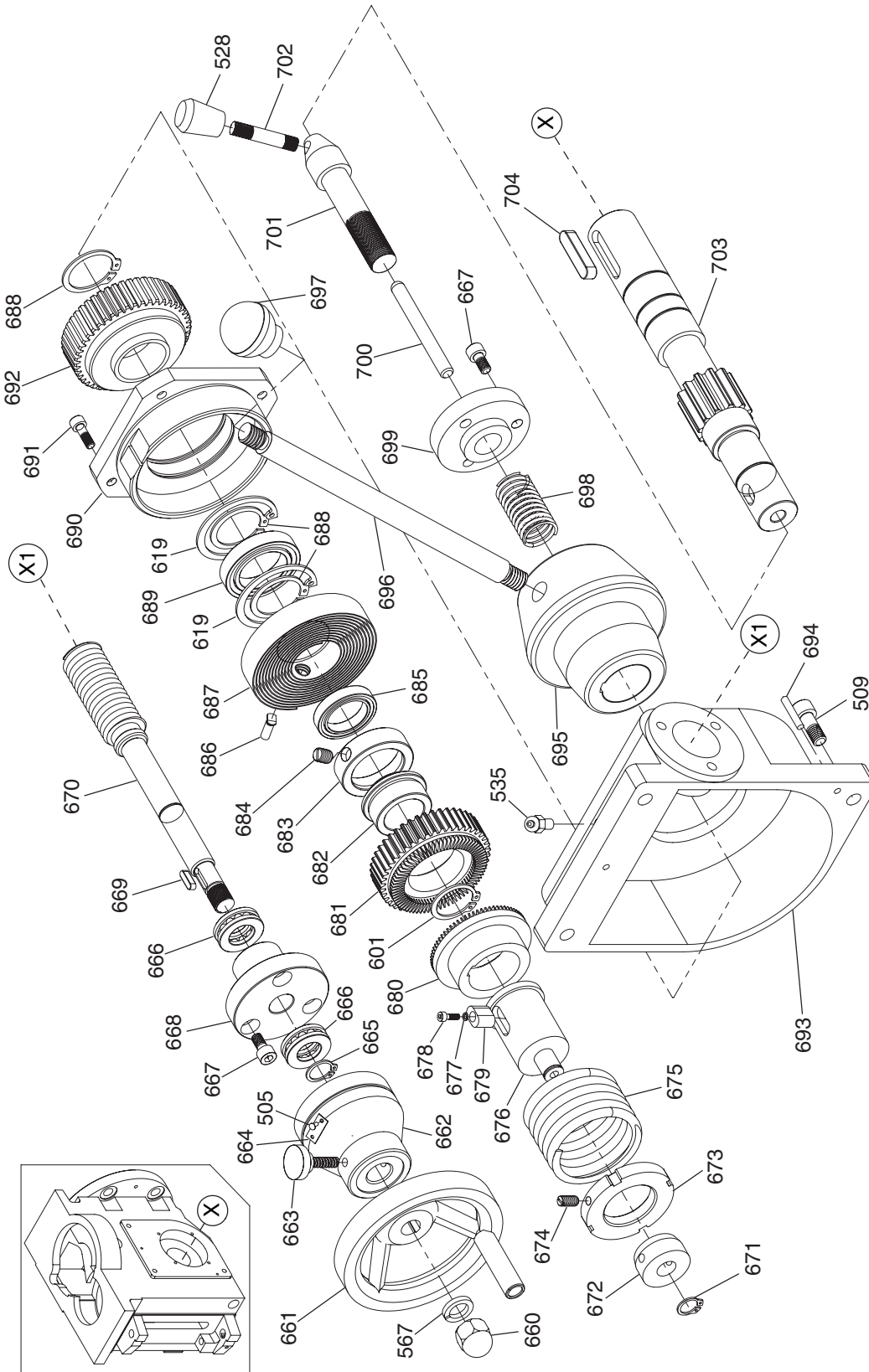
G0615 Head (B)



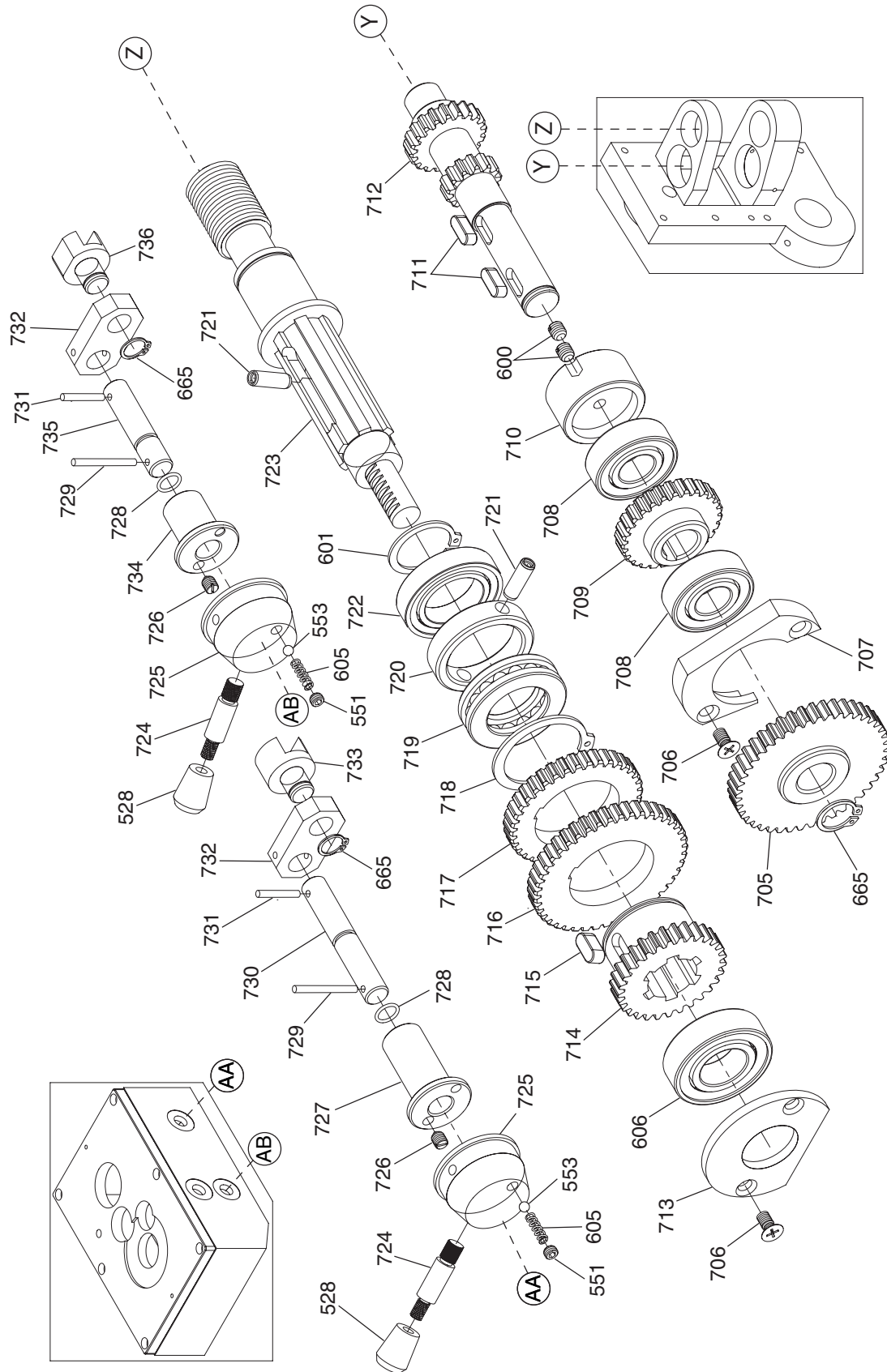
G0615 Head (C)



G0615 Head (D)



G0615 Head (E)



G0615 Head Parts List

REF	PART #	DESCRIPTION
501	P06150501	HEADSTOCK
502	P06150502	RECTANGULAR BLOCK
503	PSB01M	CAP SCREW M6-1 X 16
504	P06150504	GRADUATED SCALE
505	P06150505	RIVET 2 X 5
506	P06150506	LOCK PIN
506-1	P06150506-1	LOCK BUSHING
507	P06150507	LOCKING HANDLE
508	PLW04M	LOCK WASHER 8MM
509	PSB14M	CAP SCREW M8-1.25 X 20
510	P06150510	LIMIT STOP BRACKET
511	P06150511	THREADED BUSHING
512	P06150512	LIMIT STOP RING
513	PR06M	EXT RETAINING RING 16MM
514	P06150514	THREADED SHAFT
515	P06150515	THIN HEX NUT M4-.7
516	PSS49M	SET SCREW M4-.7 X 16
517	P06150517	THREADED PIN M6-1
518	P06150518	LEVER
519	P06150519	PIN
520	P06150520	COMPRESSION SPRING
521	P06150521	COLLAR
522	PSS05M	SET SCREW M5-.8 X 10
523	P06150523	SHAFT
524	PRP44M	ROLL PIN 3 X 10
525	P06150525	COMPRESSION SPRING
526	PRP70M	PIN 5 X 18
527	P06150527	CONTROL LEVER
528	P06150528	LEVER KNOB
529	P06150529	SHAFT
530	P06150530	BRACKET
531	PRP37M	ROLL PIN 3 X 14
532	P06150532	BRACKET
533	P06150533	TAPER PIN 4 X 18
534	PSB02M	CAP SCREW M6-1 X 20
535	P06150535	GREASE FITTING
536	P06150536	THREADED TAPER PIN M6-1 X 45
537	PSB48M	CAP SCREW M6-1 X 35
538	P06150538	BRACKET
539	P06150539	COMPRESSION SPRING
540	P06150540	PIN
541	P06150541	COMPRESSION SPRING
542	P06150542	THREADED PIN M6-1 X 16
543	P06150543	THREADED PIN M5-.8 X 14
544	P06150544	CONNECTING ROD
545	PRP03M	PIN 5 X 20
546	PSB78M	CAP SCREW M5-.8 X 40
547	P06150547	THIN HEX NUT M6-1
548	PSS91M	SET SCREW M6-1 X 14
549	P06150549	COVER

REF	PART #	DESCRIPTION
550	P06150550	INDICATOR PLATE
551	PSS96M	SET SCREW M8-1.25 X 5
552	P06150552	COMPRESSION SPRING
553	P06150553	STEEL BALL 6MM
554	P06150554	KNOB
555	PSS01M	SET SCREW M6-1 X 10
556	P06150556	COLLAR
557	P06150557	GEAR 18T
558	P06150558	TAPER PIN 4 X 40
559	P06150559	GRADUATED SCALE
560	PSB49M	CAP SCREW M6-1 X 60
561	P06150561	BEVEL GEAR 50T
562	P06150562	COVER
563	PFS06M	FLANGE SCREW M6-1 X 8
564	PSB77M	CAP SCREW M12-1.75 X 30
565	PW06M	FLAT WASHER 12MM
566	PSB77M	CAP SCREW M12-1.75 X 30
567	PLW05M	LOCK WASHER 12MM
568	P06150568	INFORMATION PLATE
569	P06150569	GEAR BOX
571	P06150571	INFORMATION PLATE
572	P06150572	GASKET
573	P06150573	OIL SIGHT GLASS
574	P06150574	OIL PLUG
575	PW04M	FLAT WASHER 10MM
576	PSB36M	CAP SCREW M12-1.75 X 25
577	P06150577	THREADED TAPER PIN 8 X 35
578	P06150578	GEAR BOX COVER
579	P06150579	OIL FILL PLUG
580	P06150580	MOTOR 3HP/220V/3-PH
580-1	P06150580-1	MOTOR FAN COVER
580-2	P06150580-2	MOTOR FAN
580-3	P06150580-3	MOTOR JUNCTION BOX
581	PLW06M	LOCK WASHER 10MM
582	PSB72M	CAP SCREW M10-1.5 X 30
583	PR68M	EXT RETAINING RING 40MM
584	P06150584	BALL BEARING 6908
585	P06150585	GEAR 26T
586	P06150586	COLLAR
587	P6005	BALL BEARING 6055ZZ
588	P06150588	O-RING 56 X 2.65
589	P06150589	COLLAR
590	PSS02M	SET SCREW M6-1 X 6
591	P06150591	GEAR SHAFT 18T
592	PK107M	KEY 8 X 8 X 20
593	P06150593	COVER
594	P6304	BALL BEARING 6304ZZ
595	P06150595	GEAR 17T
596	PK144M	KEY 6 X 6 X 16
597	P06150597	RETAINER



G0615 Head Parts List

REF	PART #	DESCRIPTION
598	P06150598	GEAR 39T
599	P06150599	COMPRESSION SPRING
600	PSS02M	SET SCREW M6-1 X 6
601	PR11M	EXT RETAINING RING 25MM
602	P06150602	GEAR 44T
603	PK145M	KEY 10 X 10 X 20
604	P06150604	GEAR 36T
605	P06150605	COMPRESSION SPRING
606	P6004	BALL BEARING 6004ZZ
607	P06150607	O-RING 47.5 X 2.65
608	P06150608	COLLAR
609	P06150609	SHAFT
610	P06150610	COVER
611	P6305	BALL BEARING 6305ZZ
612	P06150612	GEAR 39T
613	P06150613	GEAR 31T
614	P06150614	COLLAR
615	P06150615	O-RING 26.5 X 1.8
616	P06150616	OIL SEAL
617	P06150617	SPACER
618	P6204	BALL BEARING 6204ZZ
619	PR25M	INT RETAINING RING 47MM
620	P6003	BALL BEARING 6003ZZ
621	PR56M	EXT RETAINING RING 45MM
622	P06150622	GEAR 77T
623	P06150623	GEAR 15T
624	PK07M	KEY 6 X 6 X 20
625	P51100	THRUST BEARING 51100
626	PK41M	KEY 8 X 8 X 40
627	P06150627	GEAR SHAFT 39T
628	P06150628	BUSHING
629	PLW03M	LOCK WASHER 6MM
630	PSB83M	CAP SCREW M6-1 X 55
631	P06150631	DRAWBAR CAP
632	P06150632	VERTICAL DRAWBAR
633	P06150633	SPLINE BUSHING
634	PK29M	KEY 4 X 4 X 8
635	P06150635	FLANGE
636	P6208	BALL BEARING 6208ZZ
637	P06150637	GEAR 25T
638	P06150638	KEY 12 X 12 X 28
639	P06150639	GEAR 47T
640	PSS20M	SET SCREW M8-1.25 X 8
641	P06150641	COLLAR
642	P06150642	BALL BEARING 16009
643	P06150643	OIL SEAL
644	P06150644	O-RING 69 X 2.65
645	P06150645	COLLAR
646	PR67M	INT RETAINING RING 75MM
647	P06150647	COLLAR

REF	PART #	DESCRIPTION
648	P06150648	O-RING 85 X 2.65
649	P06150649	SPANNER NUT
650	P06150650	KEYED WASHER 39MM
651	P06150651	SPACER
652	P06150652	ANG CONTACT BEARING 7008AC
653	P06150653	BALL BEARING 32012
654	P06150654	SPACER
655	P06150655	QUILL
656	P06150656	COVER
657	PSB03M	CAP SCREW M5-.8 X 8
658	P06150658	VERTICAL SPINDLE
659	P06150659	KEY
660	PN46M	ACORN NUT M12-1.75
661	P06150661	HANDWHEEL
662	P06150662	GRADUATED DIAL
663	P06150663	KNURLED SCREW
664	P06150664	INDICATOR PLATE
665	PR05M	EXT RETAINING RING 15MM
666	P51102	THRUST BEARING 51102
667	PSB26M	CAP SCREW M6-1 X 12
668	P06150668	RETAINING FLANGE
669	PK134M	KEY 4 X 4 X 14
670	P06150670	WORM GEAR
671	PR03M	EXT RETAINING RING 12MM
672	P06150672	COLLAR
673	P06150673	SPANNER NUT
674	PSS04M	SET SCREW M6-1 X 12
675	P06150675	COMPRESSION SPRING
676	P06150676	SPLINE SLEEVE
677	PLW09M	LOCK WASHER 3MM
678	PSB56M	CAP SCREW M3-.5 X 10
679	P06150679	KEY
680	P06150680	CLUTCH
681	P06150681	GEAR 44T
682	P06150682	COLLAR
683	P06150683	COLLAR
684	PSS16M	SET SCREW M8-1.25 X 10
685	P06150685	BALL BEARING 61805
686	P06150686	PIN
687	P06150687	FLAT COIL SPRING
688	PR15M	EXT RETAINING RING 30MM
689	P06150689	BALL BEARING 61906
690	P06150690	SPRING BOX
691	PSB24M	CAP SCREW M5-.8 X 16
692	P06150692	BEVEL GEAR 47T
693	P06150693	GEAR HOUSING
694	P06150694	TAPER PIN 4 X 24
695	P06150695	HANDLE HUB
696	P06150696	HANDLE
697	P06150697	BALL KNOB



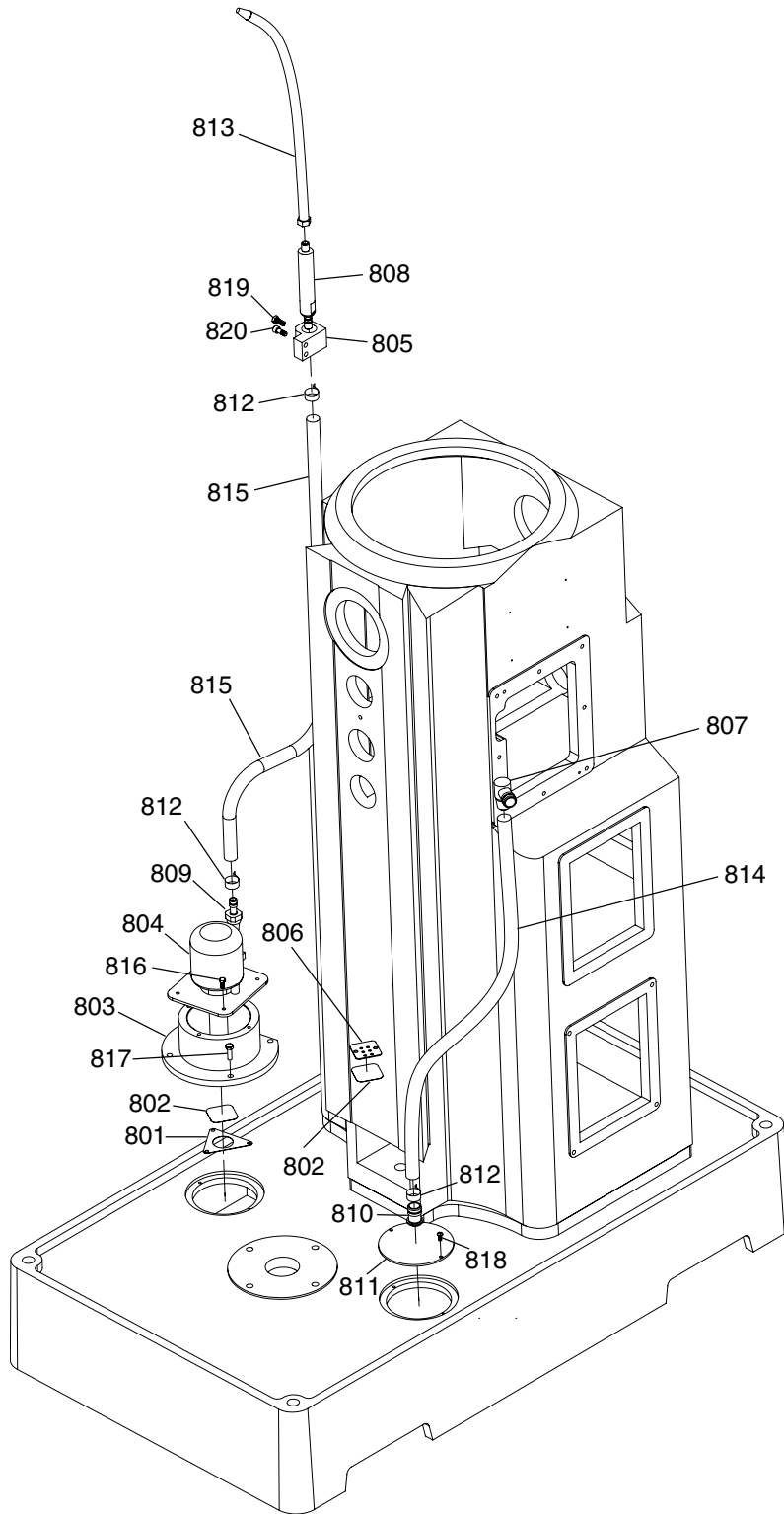
G0615 Head Parts List

REF	PART #	DESCRIPTION
698	P06150698	COMPRESSION SPRING
699	P06150699	COVER
700	P06150700	SHAFT
701	P06150701	LOCK BOLT
702	P06150702	HANDLE
703	P06150703	GEAR SHAFT 12T
704	PK129M	KEY 8 X 8 X 36
705	P06150705	GEAR 43T
706	PFH07M	FLAT HD SCR M5-.8 X 10
707	P06150707	SPACER
708	P6202	BALL BEARING 6202ZZ
709	P06150709	GEAR 27T
710	P06150710	COVER
711	PK19M	KEY 5 X 5 X 14
712	P06150712	GEAR SHAFT 20/13T
713	P06150713	FLANGE
714	P06150714	GEAR 29T
715	PK101M	KEY 6 X 6 X 14
716	P06150716	GEAR 43T
717	P06150717	GEAR 36T

REF	PART #	DESCRIPTION
718	PR30M	EXT RETAINING RING 36MM
719	P51101	THRUST BEARING 51101
720	P06150720	COLLAR
721	P06150721	THREADED PIN M6-1 X 8
722	P6905	BALL BEARING 6905
723	P06150723	WORM GEAR
724	P06150724	HANDLE
725	P06150725	HANDLE HUB
726	PSS16M	SET SCREW M8-1.25 X 10
727	P06150727	BUSHING
728	P06150728	O-RING 11.8 X 1.8
729	P06150729	TAPER PIN 4 X 45
730	P06150730	SHAFT
731	P06150731	TAPER PIN 4 X 30
732	P06150732	ROCKER ARM
733	P06150733	SHIFTING FORK
734	P06150734	BUSHING
735	P06150735	SHAFT
736	P06150736	SHIFTING FORK



G0615 Coolant



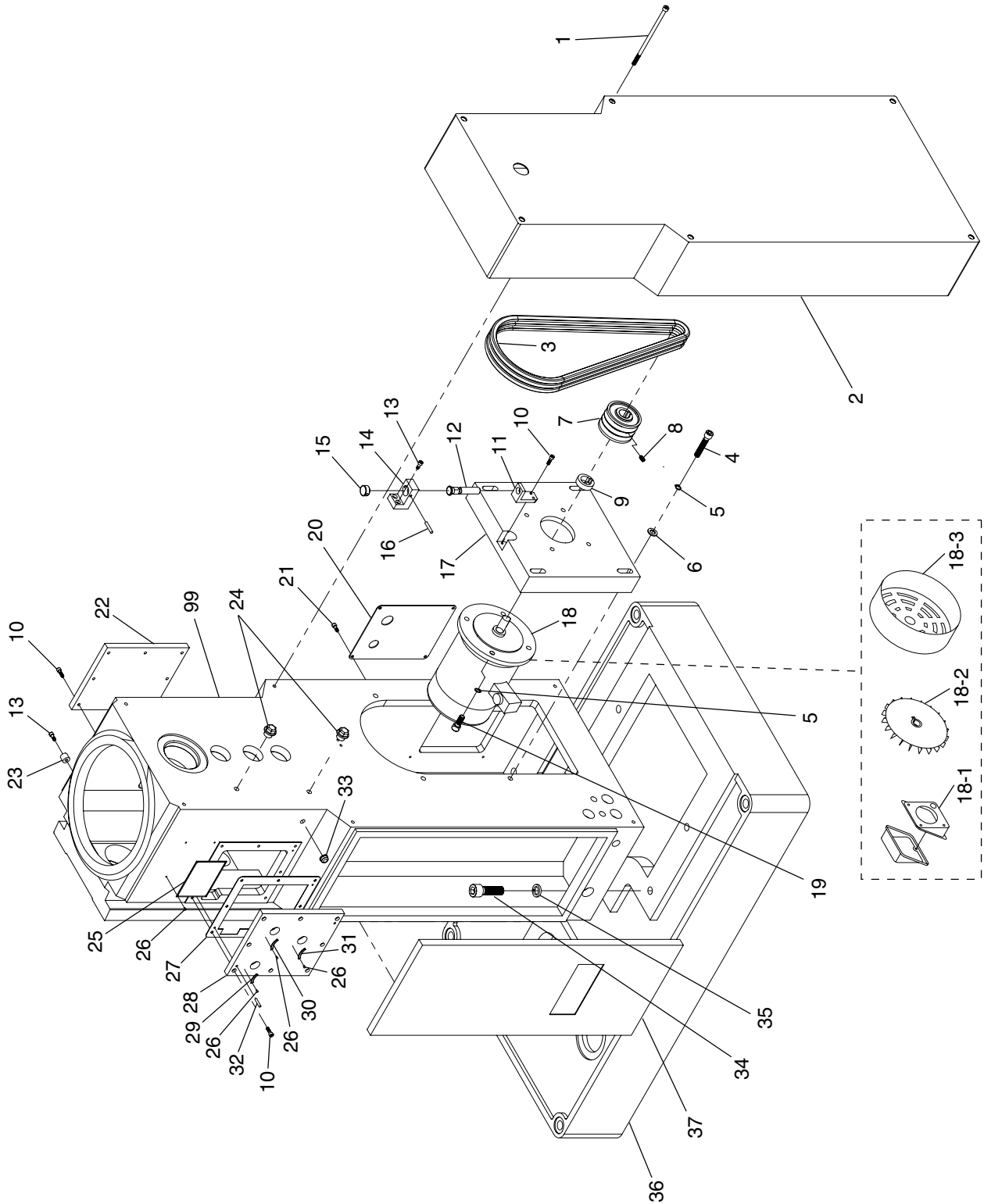
G0615 Coolant Parts List

REF	PART #	DESCRIPTION
801	P06150801	COVER
802	P06150802	FILTER SCREEN
803	P06150803	MOTOR MOUNT
804	P06150804	MOTOR .05HP/220V/3-PH
805	P06150805	BRACKET
806	P06150806	COVER
807	P06150807	CONNECTOR
808	P06150808	CONNECTOR
809	P06150809	PIPE UNION
810	P06150810	PIPE UNION

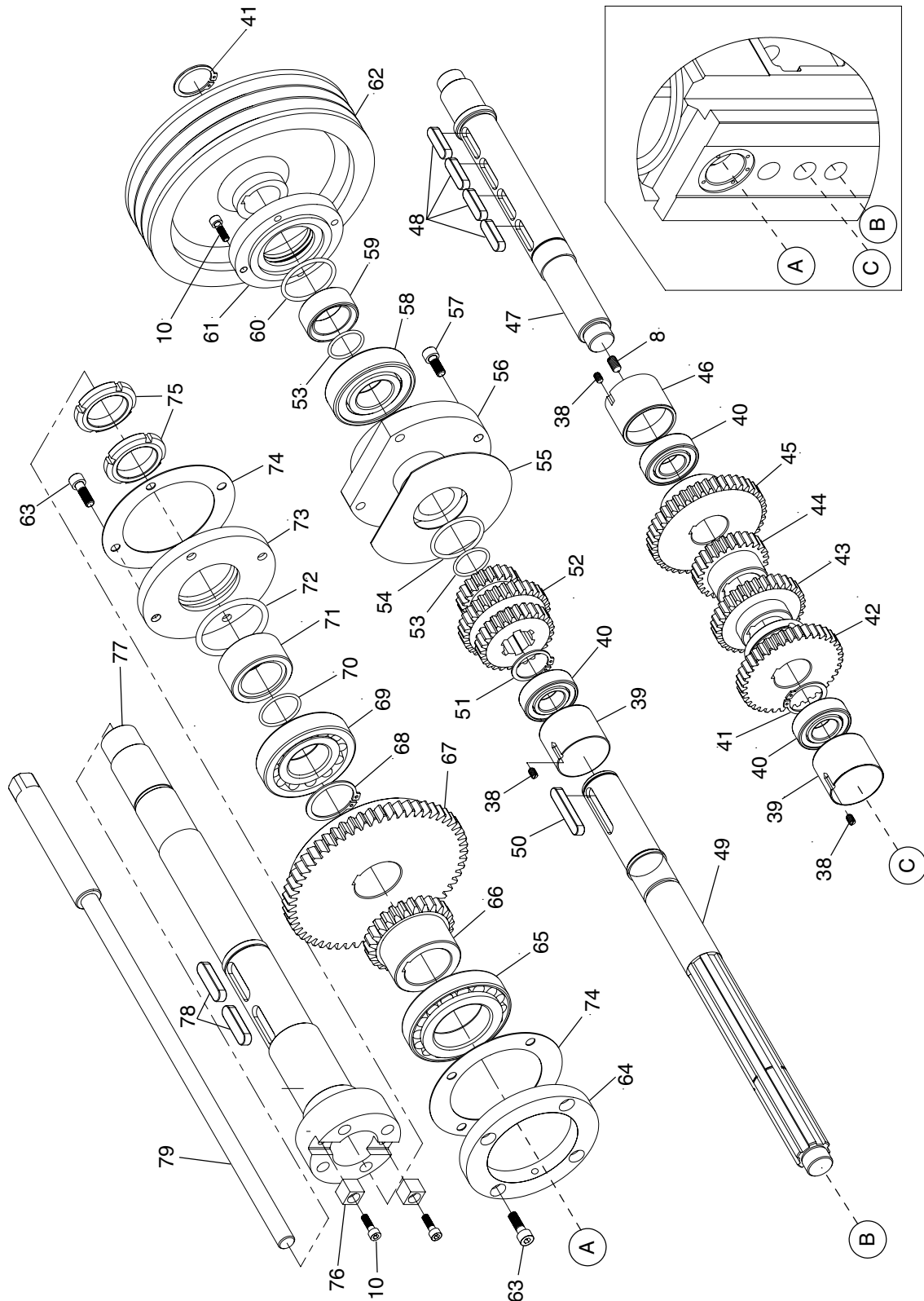
REF	PART #	DESCRIPTION
811	P06150811	SCREEN COVER
812	P06150812	CLAMP
813	P06150813	NOZZLE HOSE
814	P06150814	HOSE
815	P06150815	HOSE
816	PB107M	HEX BOLT M5-.8 X 12
817	PB08M	HEX BOLT M6-1 X 20
818	PS38M	PHLP HD SCR M4-.7 X 10
819	PB83M	HEX BOLT M6-1 X 16
820	PS11M	PHLP HD SCR M6-1 X 16



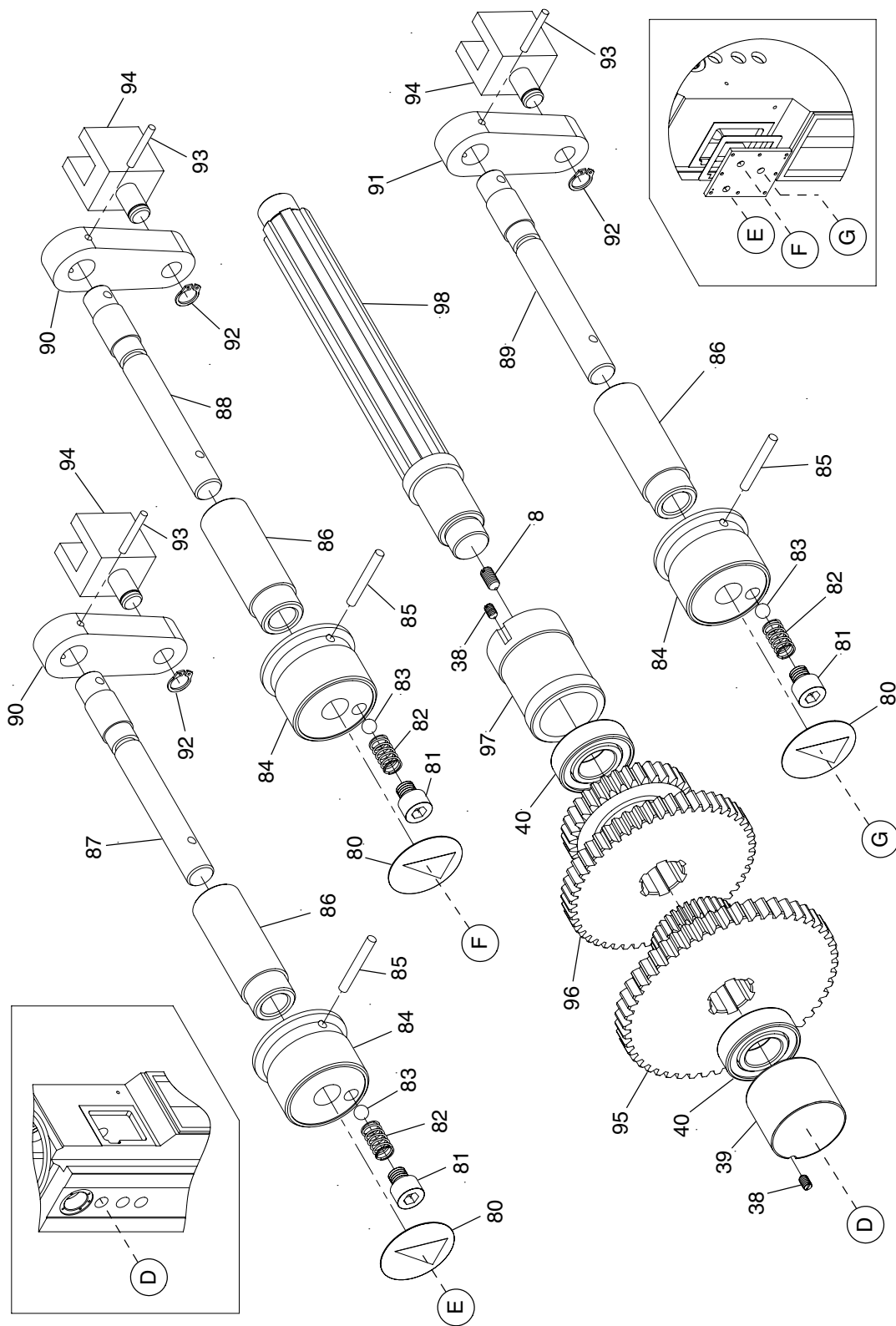
G0616 Column & Base (A)



G0616 Column & Base (B)



G0616 Column & Base (C)



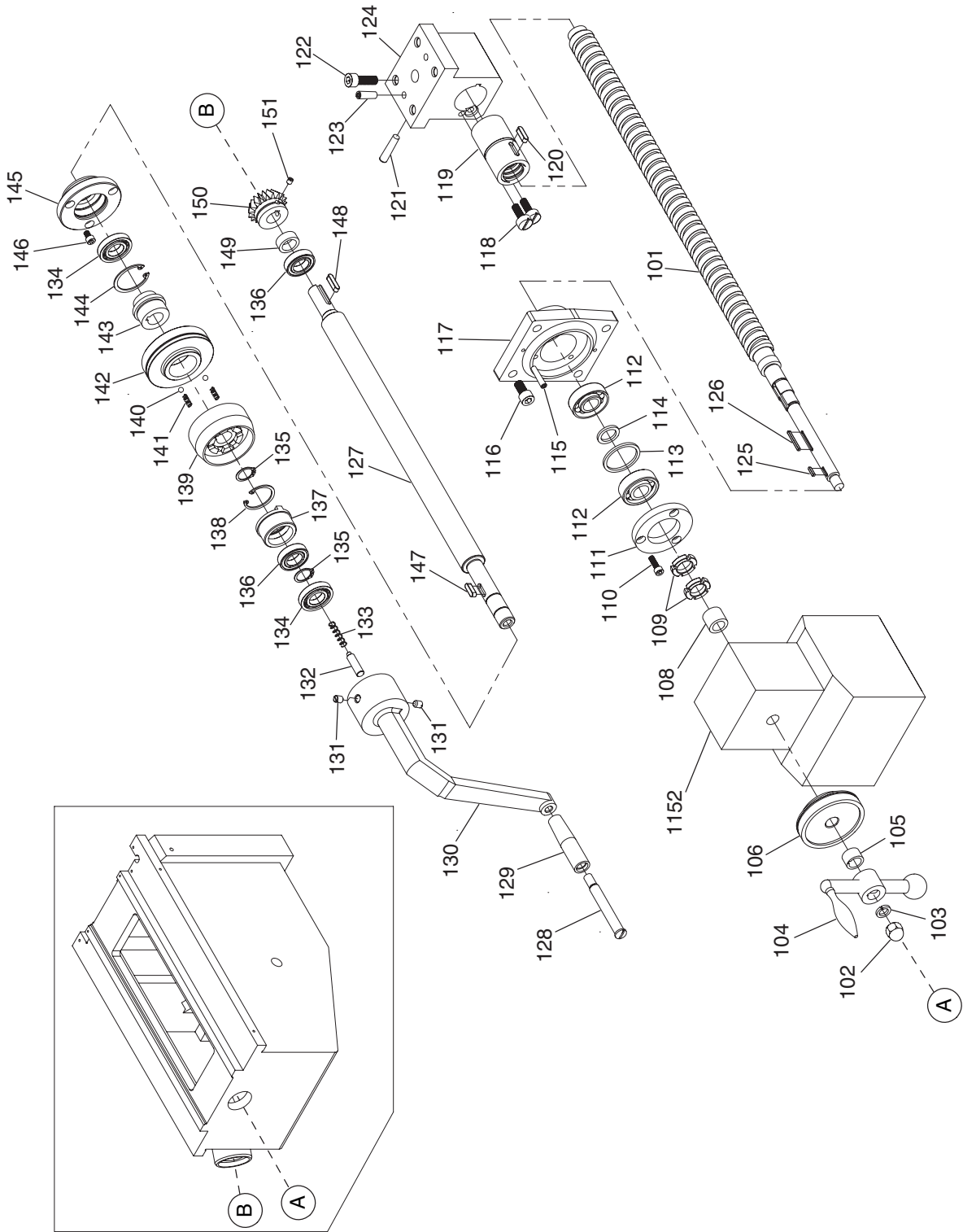
G0616 Column & Base Parts List

REF	PART #	DESCRIPTION
1	P06160001	CAP SCREW M8-1.25 X 140
2	P06160002	REAR ACCESS PANEL
3	PVA58	V-BELT A58 4L580
4	PSB160M	CAP SCREW M12-1.75 X 65
5	PLW05M	LOCK WASHER 12MM
6	PW06M	FLAT WASHER 12MM
7	P06160007	V-BELT PULLEY
8	PSS06M	SET SCREW M8.125 X 16
9	P06160009	BUSHING
10	PSB02M	CAP SCREW M6-1 X 20
11	P06160011	BRACKET
12	P06160012	ADJUSTING SCREW
13	PSB01M	CAP SCREW M6-1 X 16
14	P06160014	BRACKET
15	P06160015	CAP
16	P06160016	TAPER PIN 6 X 35
17	P06160017	MOTOR MOUNTING PLATE
18	P06160018	MOTOR 3HP/220V/3-PH
18-1	P06160018-1	MOTOR FAN COVER
18-2	P06160018-2	MOTOR FAN
18-3	P06160018-3	MOTOR JUNCTION BOX
19	PSB77M	CAP SCREW M12-1.175 X 30
20	P06160020	COVER
21	PS11M	PHLP HD SCR M6-1 X 16
22	P06160022	COVER
23	P06160023	LIMIT STOP
24	P06160024	OIL PLUG
25	P06160025	INFORMATION PLATE
26	P06160026	RIVET 2.5 X 5
27	P06160027	GASKET
28	P06160028	COVER
29	P06160029	INDICATOR PLATE
30	P06160030	INDICATOR PLATE
31	P06160031	INDICATOR PLATE
32	P06160032	TAPER PIN
33	P06160033	OIL SIGHT GLASS
34	PSB161M	CAP SCREW M20-2.5 X 65
35	PLW07M	LOCK WASHER 20MM
36	P06160036	BASE
37	P06160037	DOOR PANEL
38	PSS01M	SET SCREW M6-1 X 10
39	P06160039	PLUG
40	P6205	BALL BEARING 6205ZZ
41	PR12M	EXT RETAINING RING 35MM
42	P06160042	GEAR 38T
43	P06160043	GEAR 33T
44	P06160044	GEAR 26T
45	P06160045	GEAR 43T
46	P06160046	PLUG
47	P06160047	SHAFT
48	PK79M	KEY 10 X 8 X 55

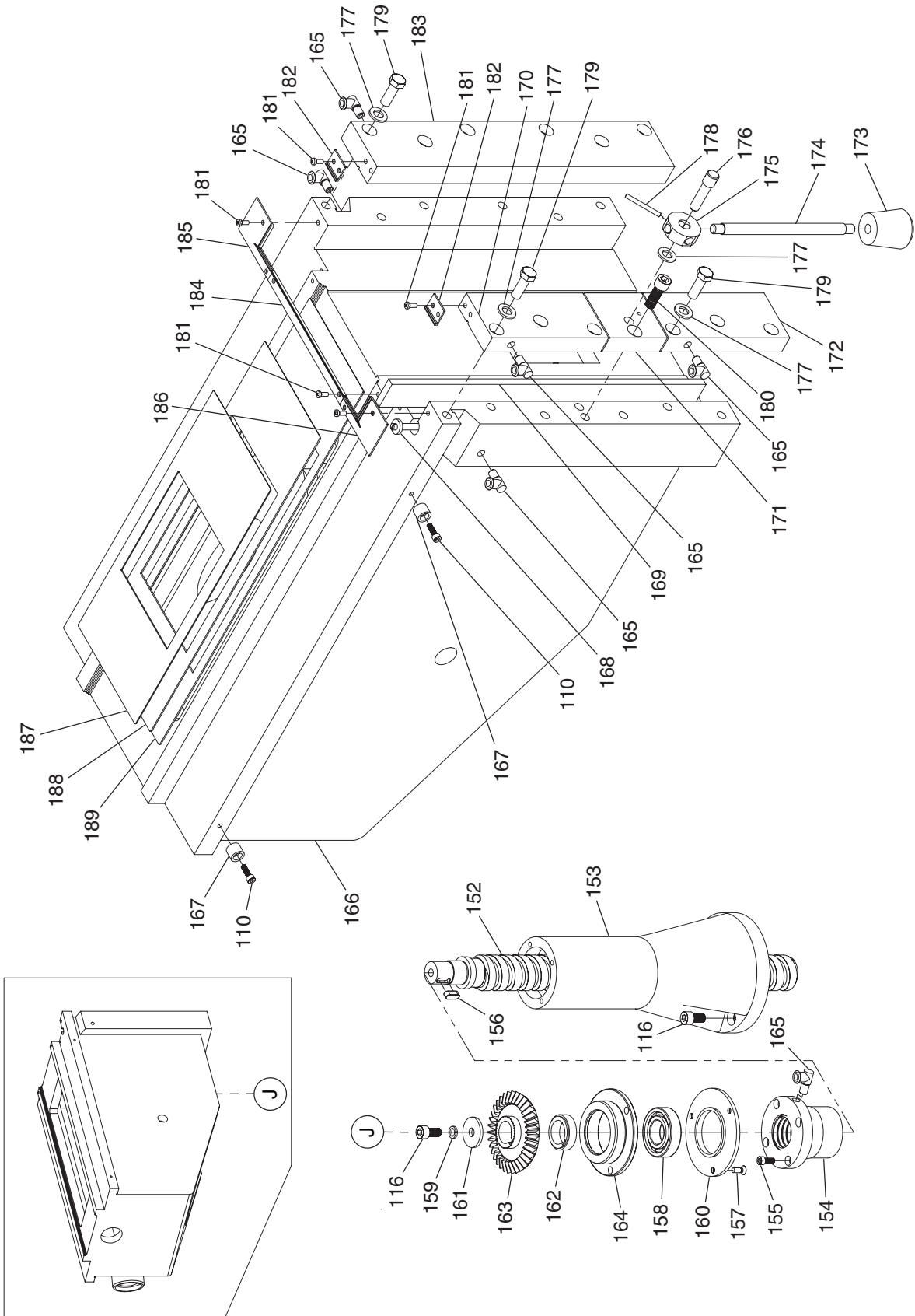
REF	PART #	DESCRIPTION
49	P06160049	SPLINED SHAFT
50	PK79M	KEY 10 X 8 X 55
51	PR84M	EXT RETAINING RING 34MM
52	P06160052	GEAR 27/32/22T
53	P06160053	O-RING 30 X 2.62
54	P06160054	O-RING 45 X 3.55
55	P06160055	GASKET
56	P06160056	FLANGE
57	PSB14M	CAP SCREW M8-1.25 X 20
58	P06160058	BALL BEARING 6307
59	P06160059	BUSHING
60	P06160060	O-RING
61	P06160061	COLLAR
62	P06160062	V-BELT PULLEY
63	PSB31M	CAP SCREW M8-1.25 X 25
64	P06160064	END COVER
65	P06160065	THRUST BEARING 50 X 90 X 23
66	P06160066	GEAR 26T
67	P06160067	GEAR 57T
68	PR56M	EXT RETAINING RING 45MM
69	P06160069	THRUST BEARING 40 X 90 X 25.25
70	P06160070	O-RING 35.5 X 2.65
71	P06160071	BUSHING
72	P06160072	O-RING 60 X 5.3
73	P06160073	END COVER
74	P06160074	GASKET
75	P06160075	SPANNER NUT
76	P06160076	SQUARE KEY
77	P06160077	HORIZONTAL SPINDLE
78	P06160078	KEY 12 X 8 X 45
79	P06160079	HORIZONTAL DRAWBAR
80	P06160080	INDICATOR PLATE
81	PSB142M	CAP SCREW M10-1.5 X 10
82	P06160082	COMPRESSION SPRING
83	P06160083	STEEL BALL 8MM
84	P06160084	HANDLE HUB
85	P06160085	TAPER PIN 5 X 40
86	P06160086	BUSHING
87	P06160087	SHAFT
88	P06160088	SHAFT
89	P06160089	SHAFT
90	P06160090	ROCKER ARM
91	P06160091	ROCKER ARM
92	PR03M	EXT RETAINING RING 12MM
93	P06160093	TAPER PIN 4 X 30
94	P06160094	SHIFTING FORK
95	P06160095	GEAR 48/17T
96	P06160096	GEAR 50/33T
97	P06160097	BUSHING
98	P06160098	SPLINED SHAFT
99	P06160099	COLUMN



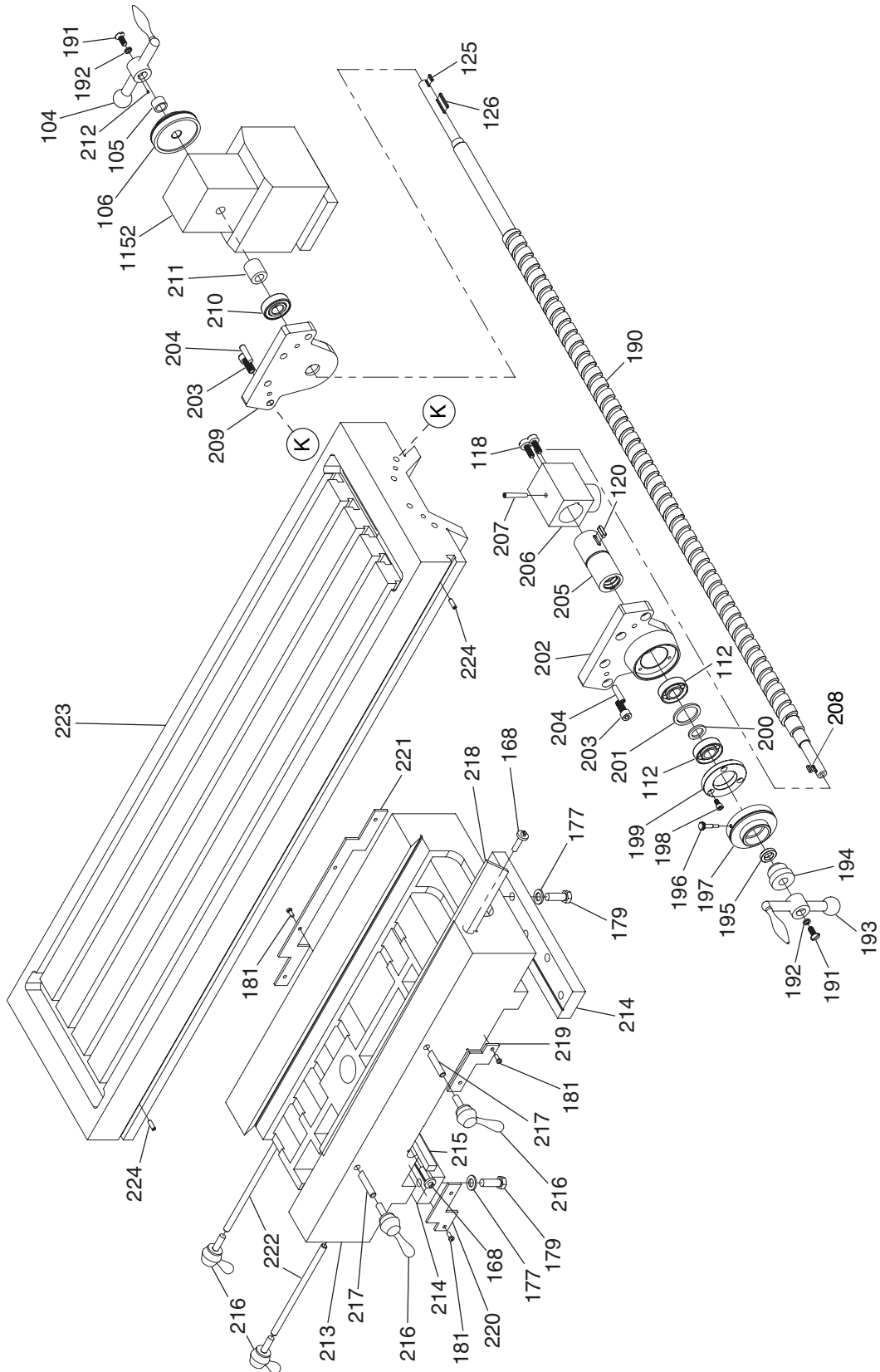
G0616 Table & Knee (A)



G0616 Table & Knee (B)



G0616 Table & Knee (C)



G0616 Table & Knee Parts List

REF	PART #	DESCRIPTION
101	P06160101	CROSS LEAD SCREW
102	PN45M	ACORN NUT M12-1.75
103	PLW05M	LOCK WASHER 12MM
104	P06160104	HANDLE
105	P06160105	BUSHING
106	P06160106	GRADUATED DIAL
108	PK134M	BUSHING
109	P06160109	SPANNER NUT
110	PSB61M	CAP SCREW M10-1.5 X 20
111	P06160111	COLLAR
112	P06160112	ANG CONTACT BEARING 7204C
113	P06160113	O-RING
114	P06160114	O-RING
115	P06160115	THREADED TAPER PIN M6-1 X 32
116	PSB61M	CAP SCREW M10-1.5 X 20
117	P06160117	BRACKET
118	P06160118	SPECIAL SCREW
119	P06160119	THREADED BUSHING
120	PK139M	KEY 6 X 6 X 22
121	P06160121	THREADED TAPER PIN M8-1.25 X 26
122	PSB72M	CAP SCREW M10-1.5 X 30
123	P06160123	THREADED TAPER PIN M8-1.25 X 26
124	P06160124	HOUSING
125	P06160125	KEY 3 X 3 X 14
126	PK141M	KEY 3 X 3 X 32
127	P06160127	SHAFT
128	P06160128	HANDLE
129	P06160129	HANDLE GRIP
130	P06160130	CRANK
131	PSS16M	SET SCREW M8-1.25 X 10
132	P06160132	SHAFT
133	P06160133	COMPRESSION SPRING
134	P6004	BALL BEARING 6004ZZ
135	PR09M	EXT RETAINING RING 20MM
136	P06160136	BALL BEARING 6904
137	P06160137	CLUTCH
138	PR85M	INT RETAINING RING 37MM
139	P06160139	CLUTCH
140	P06160140	STEEL BALL 6MM
141	P06160141	COMPRESSION SPRING
142	P06160142	GRADUATED DIAL
143	P06160143	BUSHING
144	PR24M	INT RETAINING RING 42MM
145	P06160145	BEARING HOUSING
146	PSB04M	CAP SCREW M6-1 X 10
147	PK07M	KEY 6 X 6 X 20
148	PK143M	KEY 6 X 6 X 25
149	P06160149	BUSHING
150	P06160150	BEVEL GEAR 18T
151	PSS03M	SET SCREW M6-1 X 8

REF	PART #	DESCRIPTION
152	P06160152	KNEE LEAD SCREW
153	P06160153	SUPPORT COLUMN
154	P06160154	THREADED RETAINER
155	PSB01M	CAP SCREW M6-1 X 16
156	PK107M	KEY 8 X 8 X 20
157	PS11M	PHLP HD SCR M6-1 X 16
158	P6206	BALL BEARING 6206ZZ
159	PLW06M	LOCK WASHER 10MM
160	P06160160	FLANGE
161	P06160161	SPECIAL WASHER
162	P06160162	COLLAR
163	P06160163	BEVEL GEAR 36T
164	P06160164	BEARING HOUSING
165	P06160165	OIL CUP
166	P06160166	KNEE
167	P06160167	LIMIT STOP
168	P06160168	GIB ADJUSTING SCREW
169	P06160169	KNEE GIB
170	P06160170	PRESSURE PLATE MED TOP
171	P06160171	PRESSURE PLATE SMALL
172	P06160172	PRESSURE PLATE MED BOTTOM
173	P06160173	HANDLE KNOB
174	P06160174	HANDLE
175	P06160175	HANDLE HUB
176	P06160176	SPECIAL SCREW
177	PW06M	FLAT WASHER 12MM
178	P06160178	TAPER PIN 5 X 50
179	PB75M	HEX BOLT M12-1.75 X 35
180	PSB111M	CAP SCREW M12-1.75 X 35
181	PS08M	PHLP HD SCR M5-8 X 12
182	P06160182	PLATE
183	P06160183	PRESSURE PLATE LONG
184	P06160184	WIPER PLATE MIDDLE
185	P06160185	WIPER PLATE LEFT
186	P06160186	WIPER PLATE RIGHT
187	P06160187	CHIP GUARD LARGE
188	P06160188	CHIP GUARD MEDIUM
189	P06160189	CHIP GUARD SMALL
190	P06160190	LONGITUDINAL LEAD SCREW
191	P06160191	SPECIAL SCREW
192	PLW04M	LOCK WASHER 8MM
193	P06160193	HANDLE
194	P06160194	BUSHING
195	P06160195	BUSHING
196	P06160196	KNURLED SCREW
197	P06160197	GRADUATED DIAL
198	PSB26M	CAP SCREW M6-1 X 12
199	P06160199	RETAINER
200	P06160200	O-RING
201	P06160201	O-RING



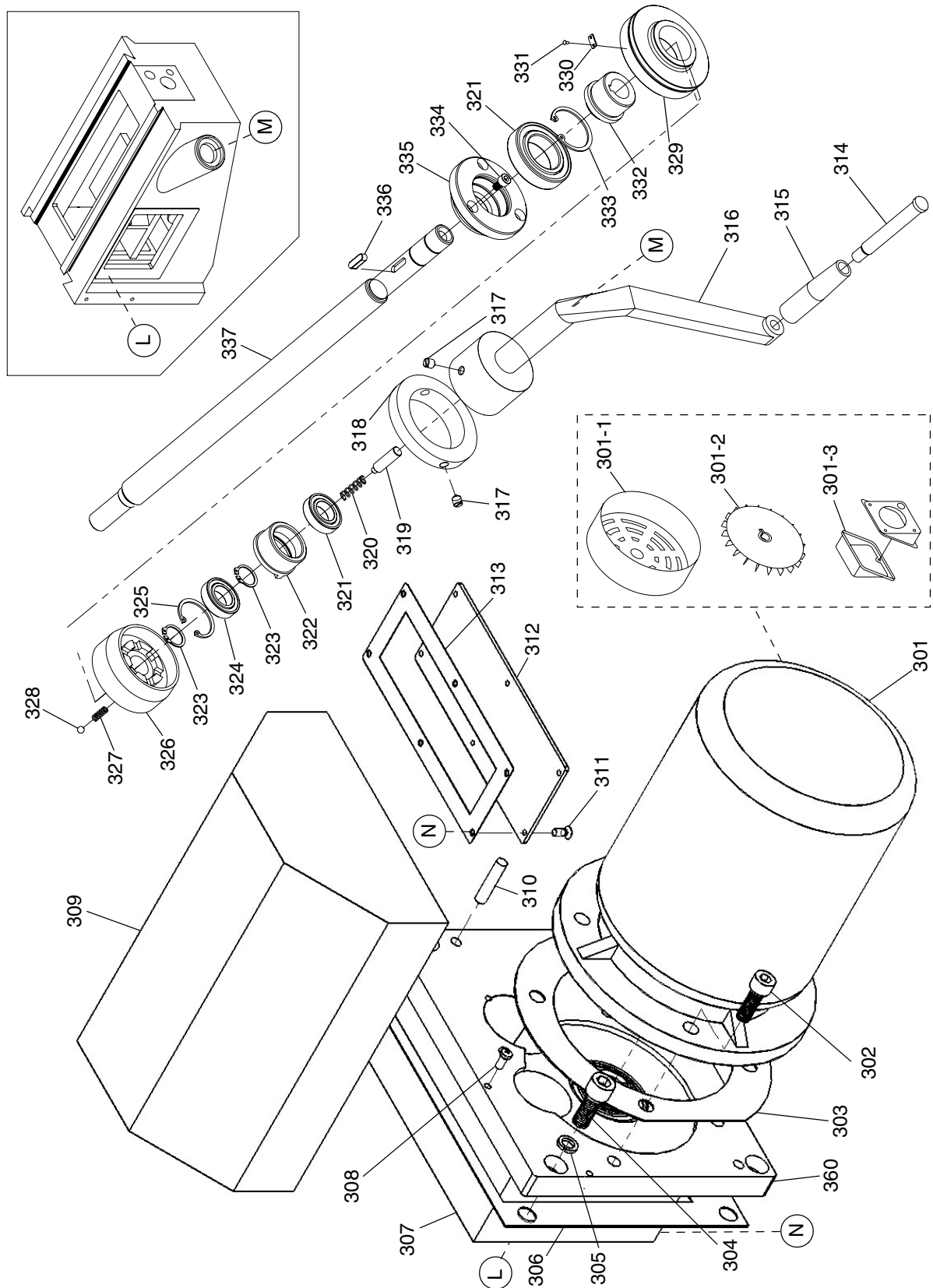
G0616 Table & Knee Parts List

REF	PART #	DESCRIPTION
202	P06160202	BRACKET
203	PSB64M	CAP SCREW M10-1.5 X 25
204	P06160204	TAPER PIN 8 X 35
205	P06160205	THREADED BUSHING
206	P06160206	HOUSING
207	P06160207	THREADED TAPER PIN 6 X 45
208	PK134M	KEY 4 X 4 X 14
209	P06160209	BRACKET
210	P6204	BALL BEARING 6204ZZ
211	P06160211	BUSHING
212	PSS97M	SET SCREW M3-.5 X 4
213	P06160213	SADDLE

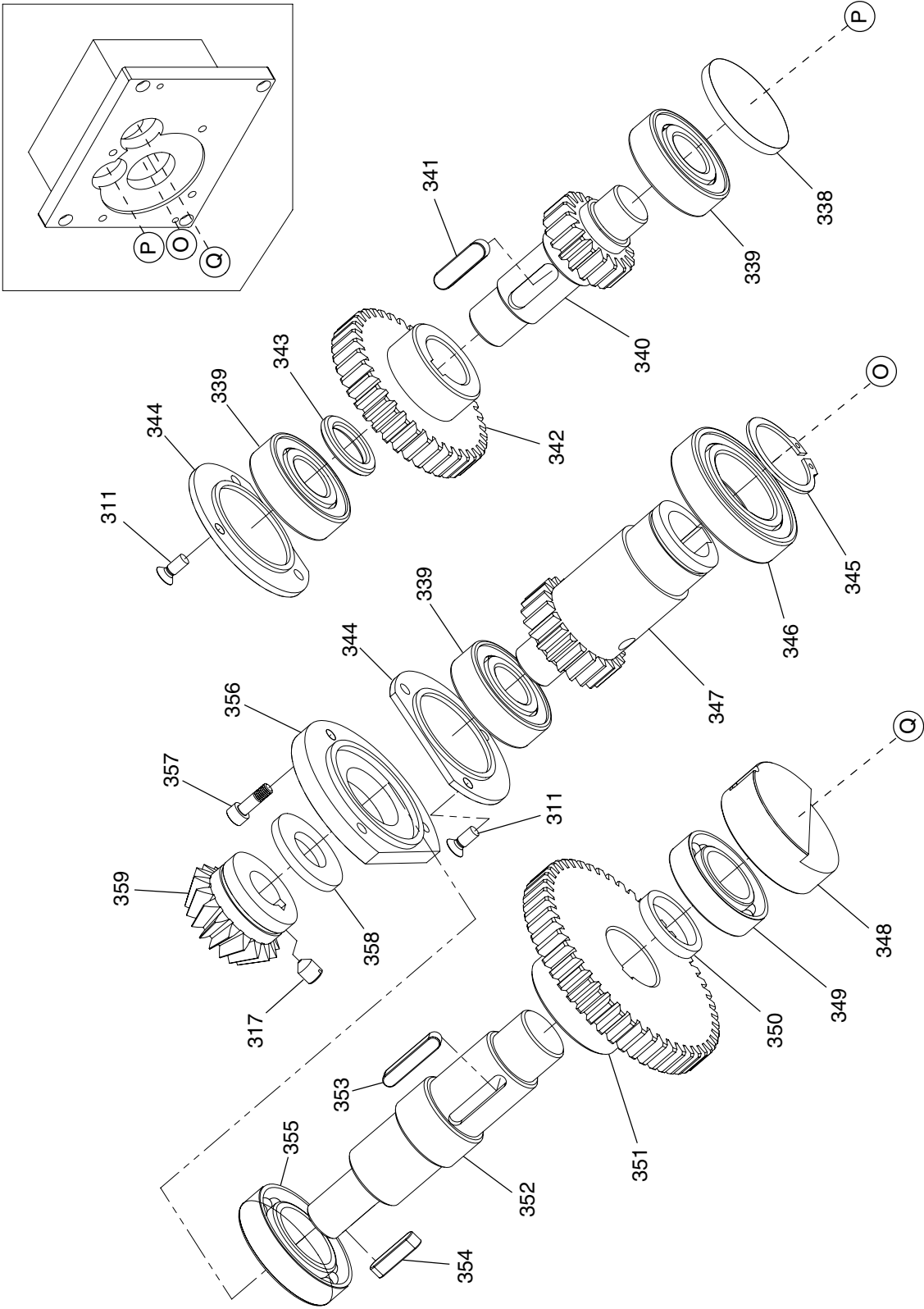
REF	PART #	DESCRIPTION
214	P06160214	PRESSURE PLATE
215	P06160215	CROSS GIB
216	P06160216	LOCK HANDLE
217	P06160217	LOCK BUSHING
218	P06160218	LONGITUDINAL GIB
219	P06160219	WIPER PLATE LEFT FRONT
220	P06160220	WIPER PLATE RIGHT FRONT
221	P06160221	WIPER PLATE REAR
222	P06160222	LOCK BUSHING
223	P06160223	TABLE
224	PSS25M	SET SCREW M6-1 X 20
1152	P06151152	POWER FEED ASSEMBLY



G0616 Z-Axis Power Lift (A)



G0616 Z-Axis Power Lift (B)



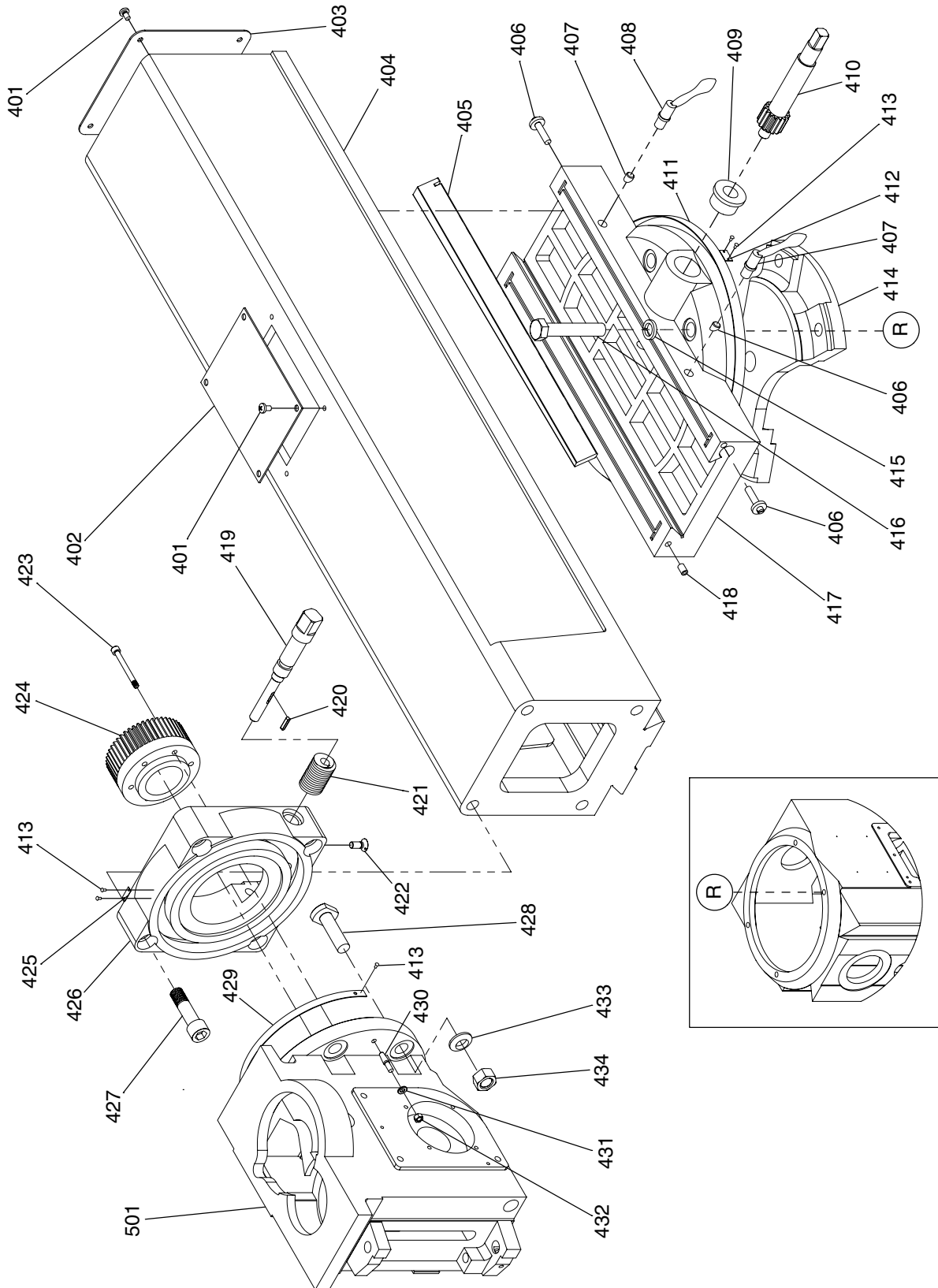
G0616 Z-Axis Power Lift Parts List

REF	PART #	DESCRIPTION
301	P06160301	MOTOR 1HP/220V/3PH
301-1	P06160301-1	MOTOR FAN COVER
301-2	P06160301-2	MOTOR FAN
301-3	P06160301-3	MOTOR JUNCTION BOX
302	PSB72M	CAP SCREW M10-1.5 X 30
303	P06160303	GASKET
304	PSB77M	CAP SCREW M12-1.75 X 30
305	PLW05M	LOCK WASHER 12MM
306	P06160306	GASKET
307	P06160307	BRACKET
308	PS08M	PHLP HD SCR M5-.8 X 12
309	P06160309	MOTOR COVER
310	P06160310	TAPER PIN 8 X 40
311	PFH05M	FLAT HD SCR M5-.8 X 12
312	P06160312	COVER
313	P06160313	GASKET
314	P06160314	HANDLE
315	P06160315	HANDLE KNOB
316	P06160316	CRANK
317	PSS16M	SET SCREW M8-1.25 X 10
318	P06160318	ADAPTER RING
319	P06160319	SHAFT
320	P06160320	COMPRESSION SPRING
321	P6004	BALL BEARING 6004ZZ
322	P06160322	COLLAR
323	PR09M	EXT RETAINING RING 20MM
324	P06160324	BALL BEARING 61904
325	PR85M	INT RETAINING RING 37MM
326	P06160326	CLUTCH
327	P06160327	COMPRESSION SPRING
328	P06160328	STEEL BALL 6MM
329	P06160329	GRADUATED DIAL

REF	PART #	DESCRIPTION
330	P06160330	INDICATOR PLATE
331	P06160331	RIVET 2 X 4
332	P06160332	COLLAR
333	PR24M	INT RETAINING RING 42MM
334	PSB04M	CAP SCREW M6-1 X 10
335	P06160335	BEARING HOUSING
336	PK07M	KEY 6 X 6 X 20
337	P06160337	SHAFT
338	P06160338	COVER
339	P6204	BALL BEARING 6204ZZ
340	P06160340	GEAR SHAFT 19T
341	P06160341	KEY 8 X 7 X 28
342	P06160342	GEAR 38T
343	P06160343	COLLAR
344	P06160344	FLANGE
345	PR12M	EXT RETAINING RING 35MM
346	P6007	BALL BEARING 6007ZZ
347	P06160347	GEAR SHAFT 22T
348	P06160348	PLUG
349	P06160349	ANG CONTACT BEARING 7005C
350	P06160350	SPACER
351	P06160351	GEAR 50T
352	P06160352	SHAFT
353	PK142M	KEY 6 X 6 X 32
354	PK143M	KEY 6 X 6 X 25
355	P6006	BALL BEARING 6006ZZ
356	P06160356	END COVER
357	PSB24M	CAP SCREW M5-.8 X 16
358	P06160358	SPECIAL WASHER
359	P06160359	BEVEL GEAR 18T
360	P06160360	MOTOR MOUNTING BRACKET



G0616 Ram



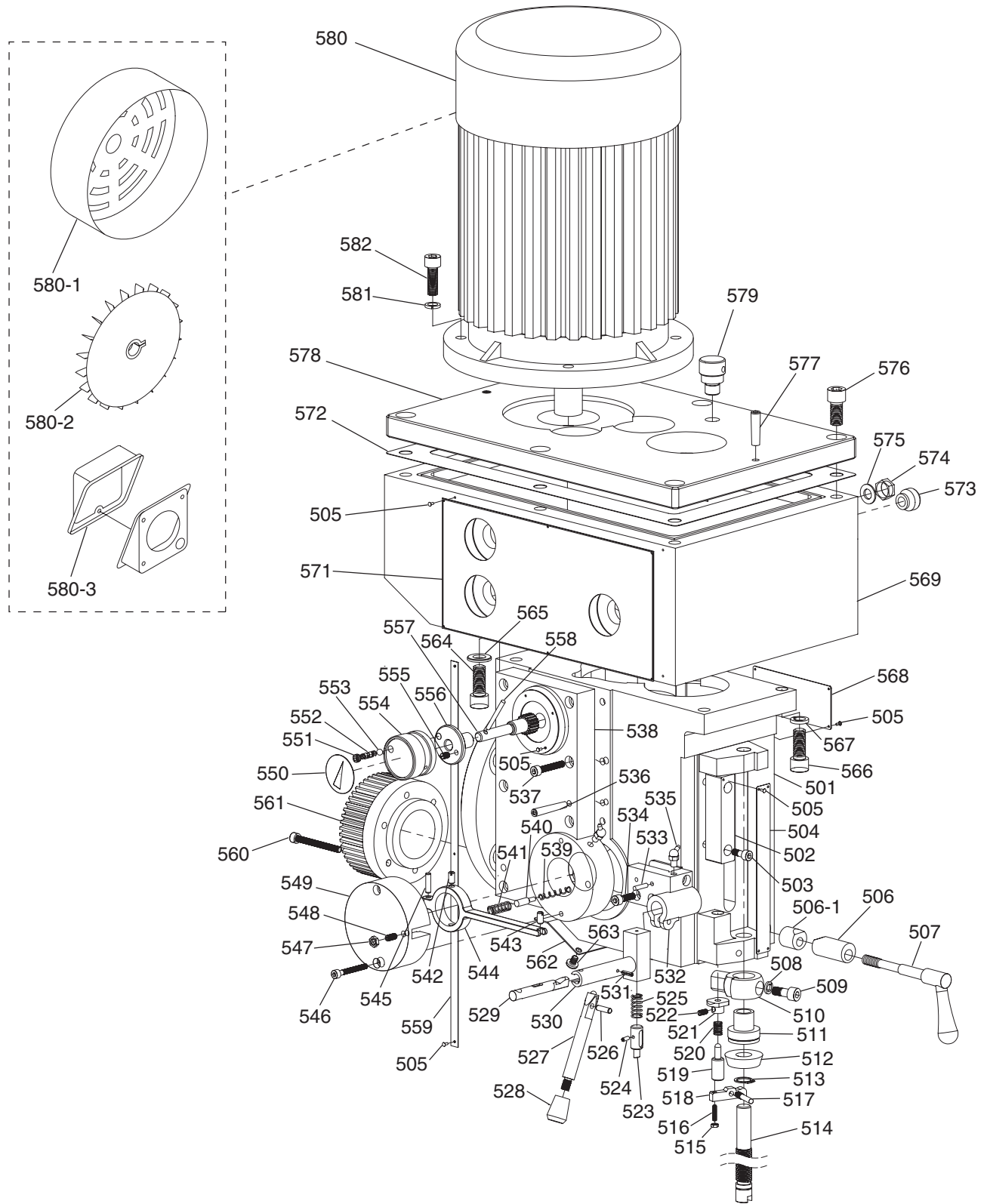
G0616 Ram Parts List

REF	PART #	DESCRIPTION
401	PS68M	PHLP HD SCR M6-1 X 10
402	P06160402	COVER
403	P06160403	COVER
404	P06160404	RAM
405	P06160405	RAM GIB
406	P06160406	GIB ADJUSTING SCREW
407	P06160407	LOCK BUSHING
408	P06160408	LOCK HANDLE
409	P06160409	BUSHING
410	P06160410	GEAR SHAFT
411	P06160411	GRADUATED SCALE
412	P06160412	INDICATOR PLATE
413	P06160413	RIVET 2.5 X 5
414	P06160414	MOUNTING BASE
415	PLW10M	LOCK WASHER 16MM
416	PB133M	HEX BOLT M16-2 X 90
417	P06160417	RAM WAY
418	P06160418	BALL OILER

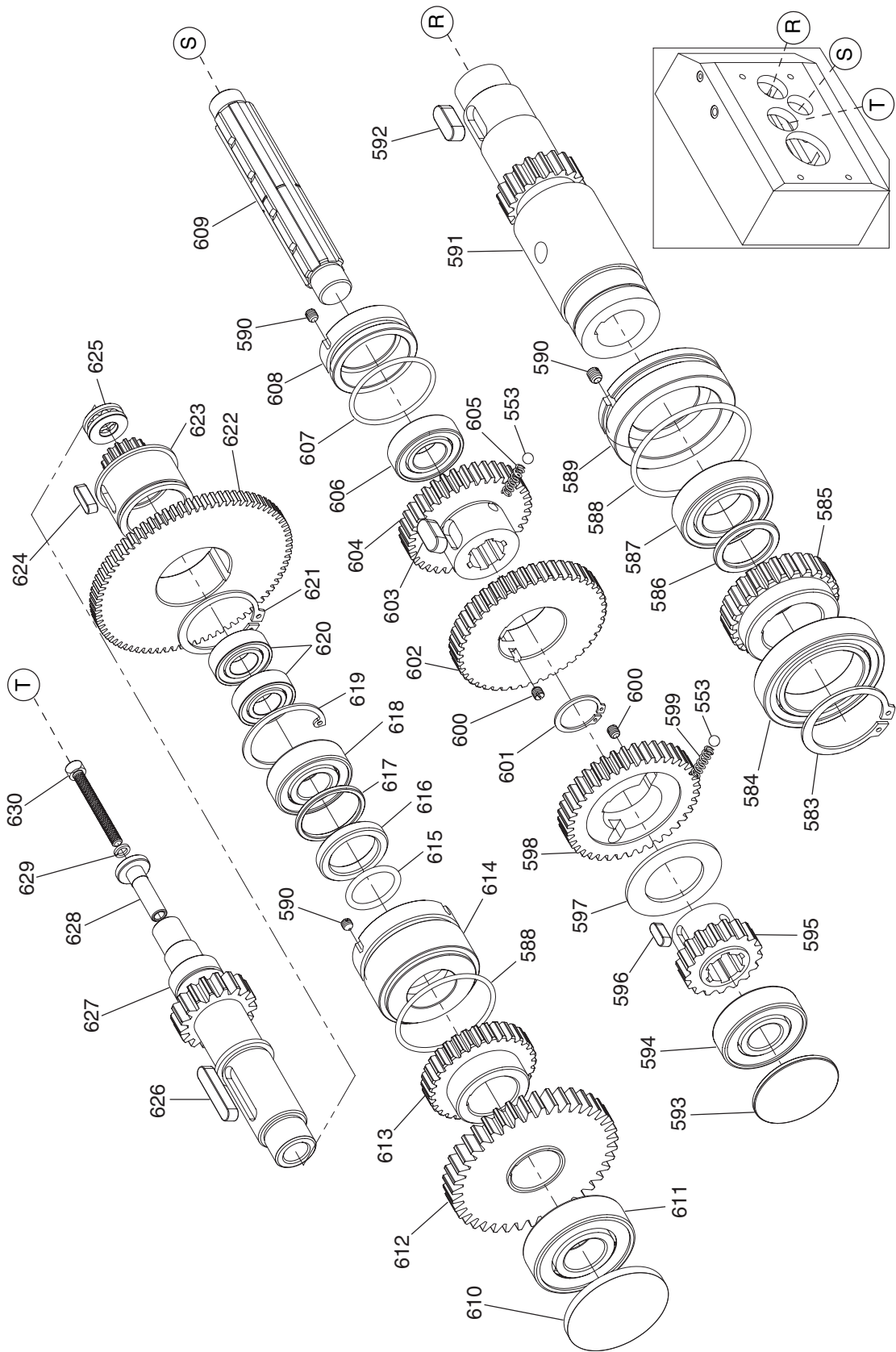
REF	PART #	DESCRIPTION
419	P06160419	SHAFT
420	PK48M	KEY 4 X 4 X 20
421	P06160421	WORM GEAR
422	P06160422	SPECIAL SCREW
423	PSB49M	CAP SCREW M6-1 X 60
424	P06160424	BEVEL GEAR 50T
425	P06160425	INDICATOR PLATE
426	P06160426	MOUNTING PLATE
427	PSB49M	CAP SCREW M6-1 X 60
428	P06160428	T-BOLT
429	P06160429	GRADUATED SCALE
430	P06160430	SPECIAL BOLT
431	PW03M	FLAT WASHER 6MM
432	PN01M	HEX NUT M6-1
433	PW08M	FLAT WASHER 16MM
434	PN13M	HEX NUT M16-2
501	P06160501	HEADSTOCK



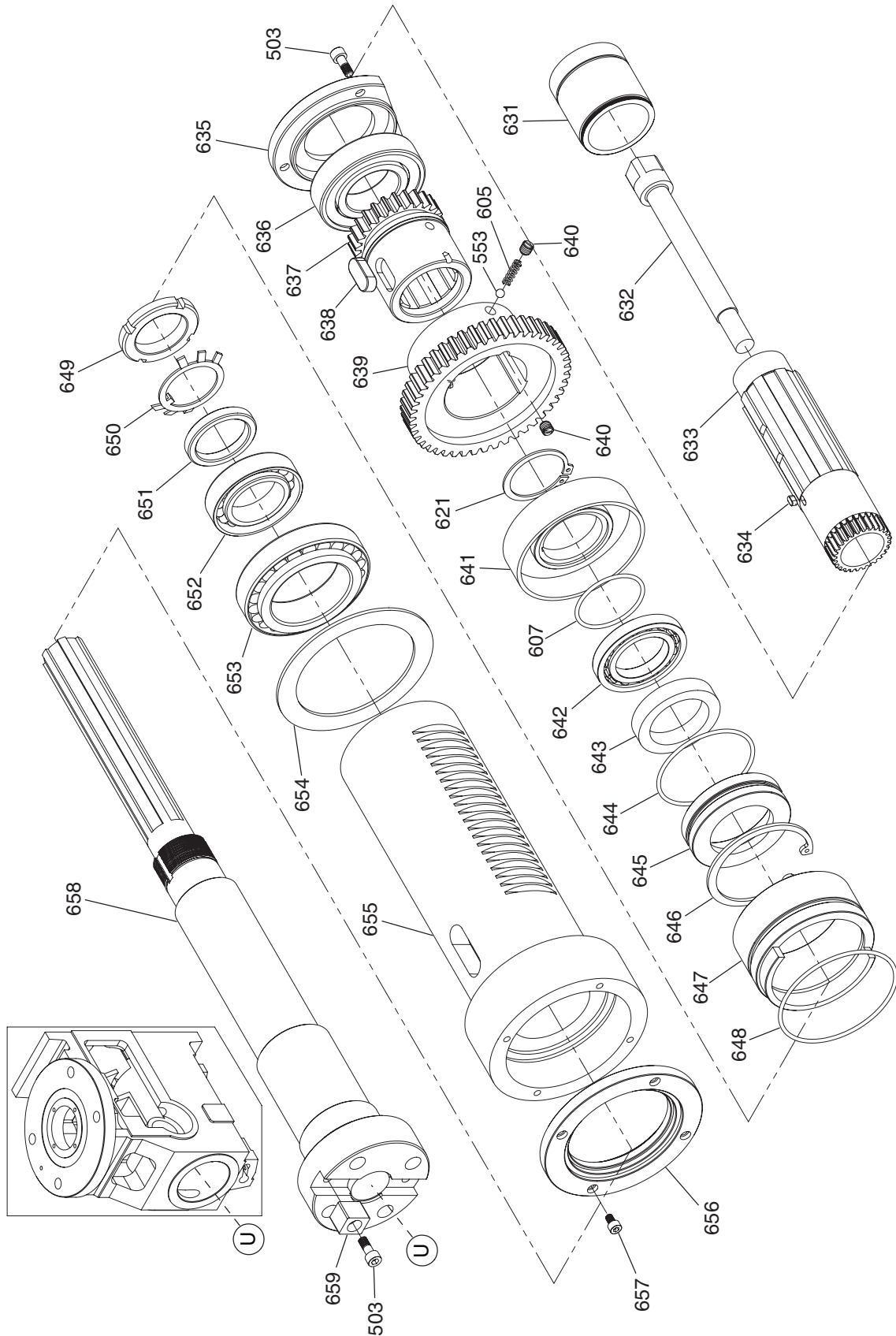
G0616 Head (A)



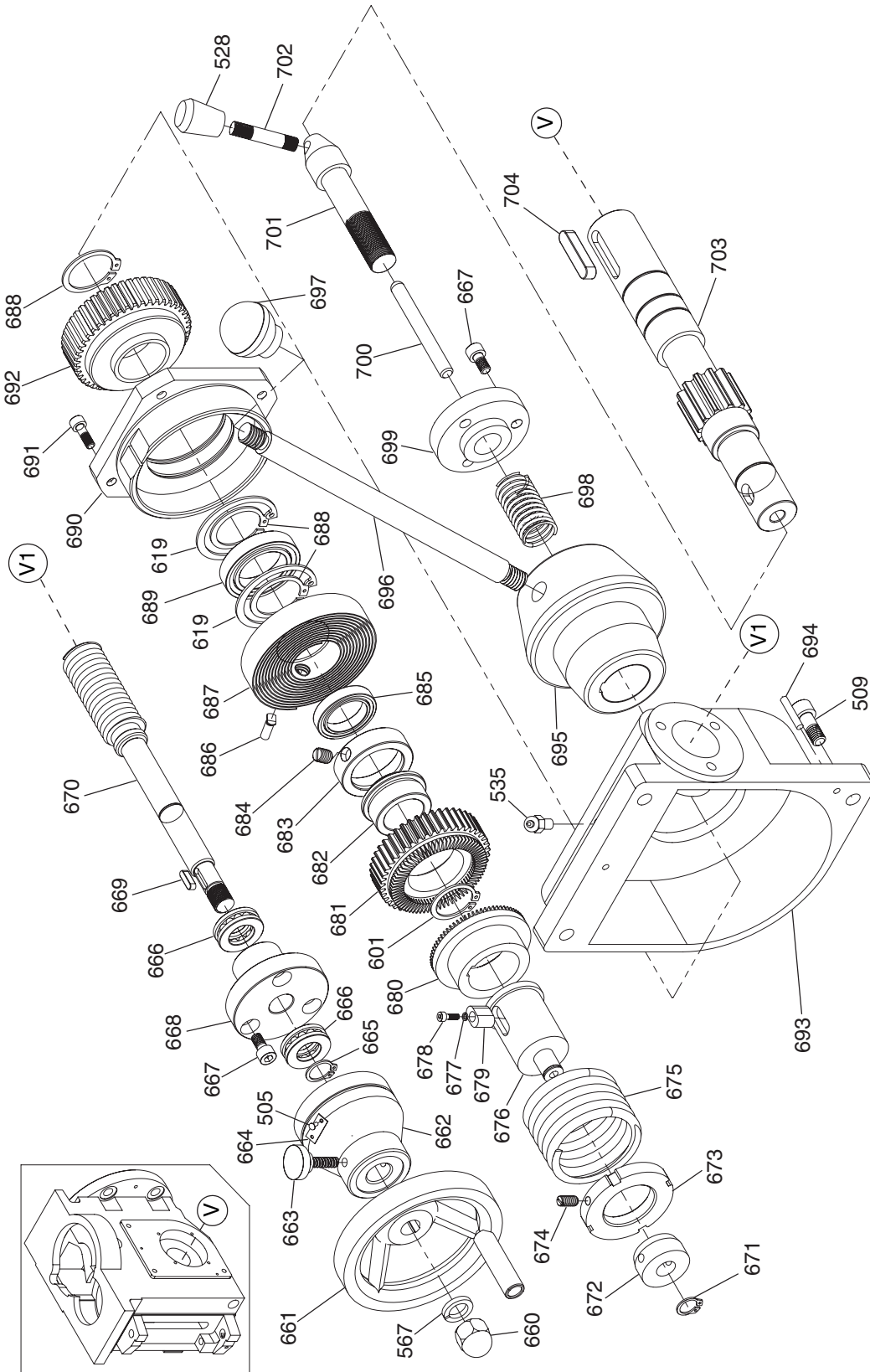
G0616 Head (B)



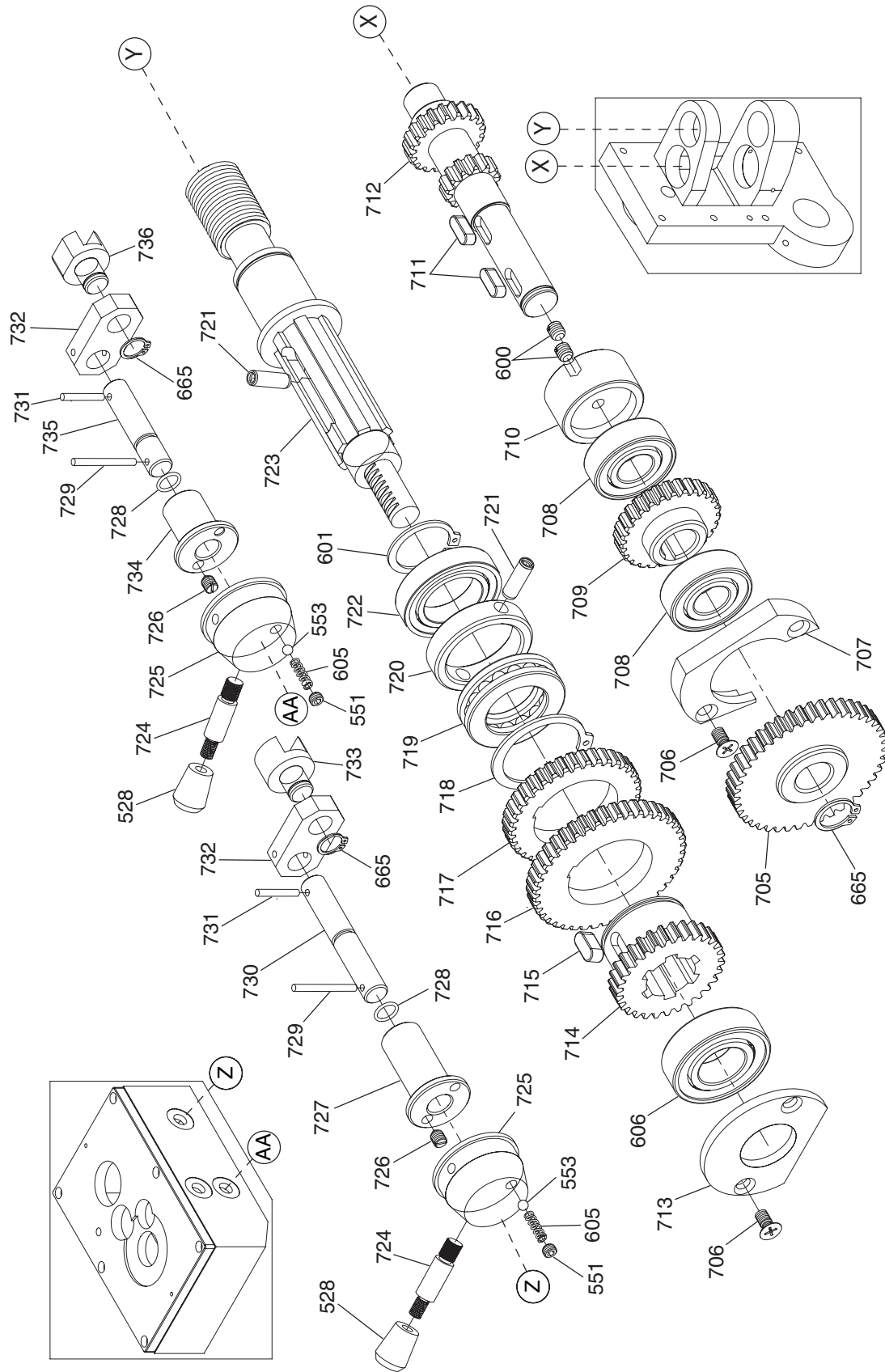
G0616 Head (C)



G0616 Head (D)



G0616 Head (E)



G0616 Head Parts List

REF	PART #	DESCRIPTION
501	P06160501	HEADSTOCK
502	P06160502	RECTANGULAR BLOCK
503	PSB01M	CAP SCREW M6-1 X 16
504	P06160504	GRADUATED SCALE
505	P06160505	RIVET 2 X 5
506	P06160506	LOCK BLOCK
506-1	P06160506-1	LOCK PIN
507	P06160507	LOCKING HANDLE
508	PLW04M	LOCK WASHER 8MM
509	PSB14M	CAP SCREW M8-1.25 X 20
510	P06160510	LIMIT STOP BRACKET
511	P06160511	THREADED BUSHING
512	P06160512	LIMIT STOP RING
513	PR06M	EXT RETAINING RING 16MM
514	P06160514	THREADED SHAFT
515	P06160515	THIN HEX NUT M4-.7
516	PSS49M	SET SCREW M4-.7 X 16
517	P06160517	THREADED PIN M6-1
518	P06160518	LEVER
519	P06160519	PIN
520	P06160520	COMPRESSION SPRING
521	P06160521	COLLAR
522	PSS05M	SET SCREW M5-.8 X 10
523	P06160523	SHAFT
524	PRP44M	ROLL PIN 3 X 10
525	P06160525	COMPRESSION SPRING
526	PRP70M	PIN 5 X 18
527	P06160527	CONTROL LEVER
528	P06160528	LEVER KNOB
529	P06160529	SHAFT
530	P06160530	BRACKET
531	PRP37M	ROLL PIN 3 X 14
532	P06160532	BRACKET
533	P06160533	TAPER PIN 4 X 18
534	PSB02M	CAP SCREW M6-1 X 20
535	P06160535	GREASE FITTING
536	P06160536	THREADED TAPER PIN M6-1 X 45
537	PB52M	HEX BOLT M6-1 X 35
538	P06160538	BRACKET
539	P06160539	COMPRESSION SPRING
540	P06160540	PIN
541	P06160541	COMPRESSION SPRING
542	P06160542	THREADED PIN M6-1 X 16
543	P06160543	THREADED PIN M5-.8 X 14
544	P06160544	CONNECTING ROD
545	PRP03M	PIN 5 X 20
546	PSB78M	CAP SCREW M5-.8 X 40
547	P06160547	THIN HEX NUT M6-1
548	PSS91M	SET SCREW M6-1 X 14
549	P06160549	COVER

REF	PART #	DESCRIPTION
550	P06160550	INDICATOR PLATE
551	PSS96M	SET SCREW M8-1.25 X 5
552	P06160552	COMPRESSION SPRING
553	P06160553	STEEL BALL 6MM
554	P06160554	KNOB
555	PSS01M	SET SCREW M6-1 X 10
556	P06160556	COLLAR
557	P06160557	GEAR SHAFT 18T
558	P06160558	TAPER PIN 4 X 40
559	P06160559	GRADUATED SCALE
560	PSB49M	CAP SCREW M6-1 X 60
561	P06160561	GEAR 50T
562	P06160562	COVER
563	PFS06M	FLANGE SCREW M6-1 X 8
564	PSB77M	CAP SCREW M12-1.75 X 30
565	PW06M	FLAT WASHER 12MM
566	PSB77M	CAP SCREW M12-1.75 X 30
567	PLW05M	LOCK WASHER 12MM
568	P06160568	INFORMATION PLATE
569	P06160569	GEAR BOX
571	P06160571	INFORMATION PLATE
572	P06160572	GASKET
573	P06160573	OIL SIGHT GLASS
574	P06160574	OIL PLUG
575	PW04M	FLAT WASHER 10MM
576	PSB36M	CAP SCREW M12-1.75 X 25
577	P06160577	THREADED TAPER PIN 8 X 35
578	P06160578	GEAR BOX COVER
579	P06160579	OIL PLUG
580	P06160580	MOTOR 3HP/220V/3-PH
580-1	P06160580-1	MOTOR FAN COVER
580-2	P06160580-2	MOTOR FAN
580-3	P06160580-3	MOTOR JUNCTION BOX
581	PLW06M	LOCK WASHER 10MM
582	PSB72M	CAP SCREW M10-1.5 X 30
583	PR68M	EXT RETAINING RING 40MM
584	P06160584	BALL BEARING 6908
585	P06160585	GEAR 26T
586	P06160586	COLLAR
587	P6005	BALL BEARING 6055ZZ
588	P06160588	O-RING 56 X 2.65
589	P06160589	COLLAR
590	PSS02M	SET SCREW M6-1 X 6
591	P06160591	GEAR SHAFT 18T
592	PK107M	KEY 8 X 8 X 20
593	P06160593	COVER
594	P6304	BALL BEARING 6304ZZ
595	P06160595	GEAR 17T
596	PK144M	KEY 6 X 6 X 16
597	P06160597	COLLAR



G0616 Head Parts List

REF	PART #	DESCRIPTION
598	P06160598	GEAR 39T
599	P06160599	COMPRESSION SPRING
600	PSS02M	SET SCREW M6-1 X 6
601	PR11M	EXT RETAINING RING 25MM
602	P06160602	GEAR 44T
603	PK145M	KEY 10 X 10 X 20
604	P06160604	GEAR 36T
605	P06160605	COMPRESSION SPRING
606	P6004	BALL BEARING 6004ZZ
607	P06160607	O-RING 47.5 X 2.65
608	P06160608	COLLAR
609	P06160609	SHAFT
610	P06160610	COVER
611	P6305	BALL BEARING 6305ZZ
612	P06160612	GEAR 39T
613	P06160613	GEAR 31T
614	P06160614	COLLAR
615	P06160615	O-RING 26.5 X 1.8
616	P06160616	OIL SEAL
617	P06160617	SPACER
618	P6204	BALL BEARING 6204ZZ
619	PR25M	INT RETAINING RING 47MM
620	P6003	BALL BEARING 6003ZZ
621	PR56M	EXT RETAINING RING 45MM
622	P06160622	GEAR 77T
623	P06160623	GEAR 15T
624	PK07M	KEY 6 X 6 X 20
625	P51100	THRUST BEARING 51100
626	PK41M	KEY 8 X 8 X 40
627	P06160627	GEAR SHAFT 39T
628	P06160628	BUSHING
629	PLW03M	LOCK WASHER 6MM
630	PSB83M	CAP SCREW M6-1 X 55
631	P06160631	DRAWBAR CAP
632	P06160632	VERTICAL DRAWBAR
633	P06160633	SPLINE BUSHING
634	PK29M	KEY 4 X 4 X 8
635	P06160635	FLANGE
636	P6208	BALL BEARING 6208ZZ
637	P06160637	GEAR 25T
638	P06160638	KEY 12 X 12 X 28
639	P06160639	GEAR 47T
640	PSS20M	SET SCREW M8-1.25 X 8
641	P06160641	COLLAR
642	P06160642	BALL BEARING 16009
643	P06160643	OIL SEAL
644	P06160644	O-RING 69 X 2.65
645	P06160645	COLLAR
646	PR67M	INT RETAINING RING 75MM
647	P06160647	COLLAR

REF	PART #	DESCRIPTION
648	P06160648	O-RING 85 X 2.65
649	P06160649	SPANNER NUT
650	P06160650	KEYED WASHER 39MM
651	P06160651	SPACER
652	P06160652	ANG CONTACT BEARING 7008AC
653	P06160653	BALL BEARING 32012
654	P06160654	SPACER
655	P06160655	QUILL
656	P06160656	COLLAR
657	PSB03M	CAP SCREW M5-.8 X 8
658	P06160658	VERTICAL SPINDLE
659	P06160659	KEY
660	PN46M	ACORN NUT M12-1.75
661	P06160661	HANDWHEEL
662	P06160662	GRADUATED DIAL
663	P06160663	KNURLED SCREW
664	P06160664	INDICATOR PLATE
665	PR05M	EXT RETAINING RING 15MM
666	P51102	THRUST BEARING 51102
667	PSB26M	CAP SCREW M6-1 X 12
668	P06160668	RETAINING FLANGE
669	PK134M	KEY 4 X 4 X14
670	P06160670	WORM GEAR
671	PR03M	EXT RETAINING RING 12MM
672	P06160672	COLLAR
673	P06160673	LOCKING SPANNER NUT
674	PSS04M	SET SCREW M6-1 X 12
675	P06160675	COMPRESSION SPRING
676	P06160676	SPLINE SLEEVE
677	PLW09M	LOCK WASHER 3MM
678	PSB56M	CAP SCREW M3-.5 X 10
679	P06160679	KEY
680	P06160680	CLUTCH
681	P06160681	GEAR 44T
682	P06160682	BUSHING
683	P06160683	LOCK COLLAR
684	PSS16M	SET SCREW M8-1.25 X 10
685	P06160685	BALL BEARING 61805
686	P06160686	PIN
687	P06160687	FLAT COIL SPRING
688	PR15M	EXT RETAINING RING 30MM
689	P06160689	BALL BEARING 61906
690	P06160690	SPRING BOX
691	PSB24M	CAP SCREW M5-.8 X 16
692	P06160692	GEAR 47T
693	P06160693	GEAR HOUSING
694	P06160694	TAPER PIN 4 X 24
695	P06160695	HANDLE HUB
696	P06160696	HANDLE
697	P06160697	BALL KNOB



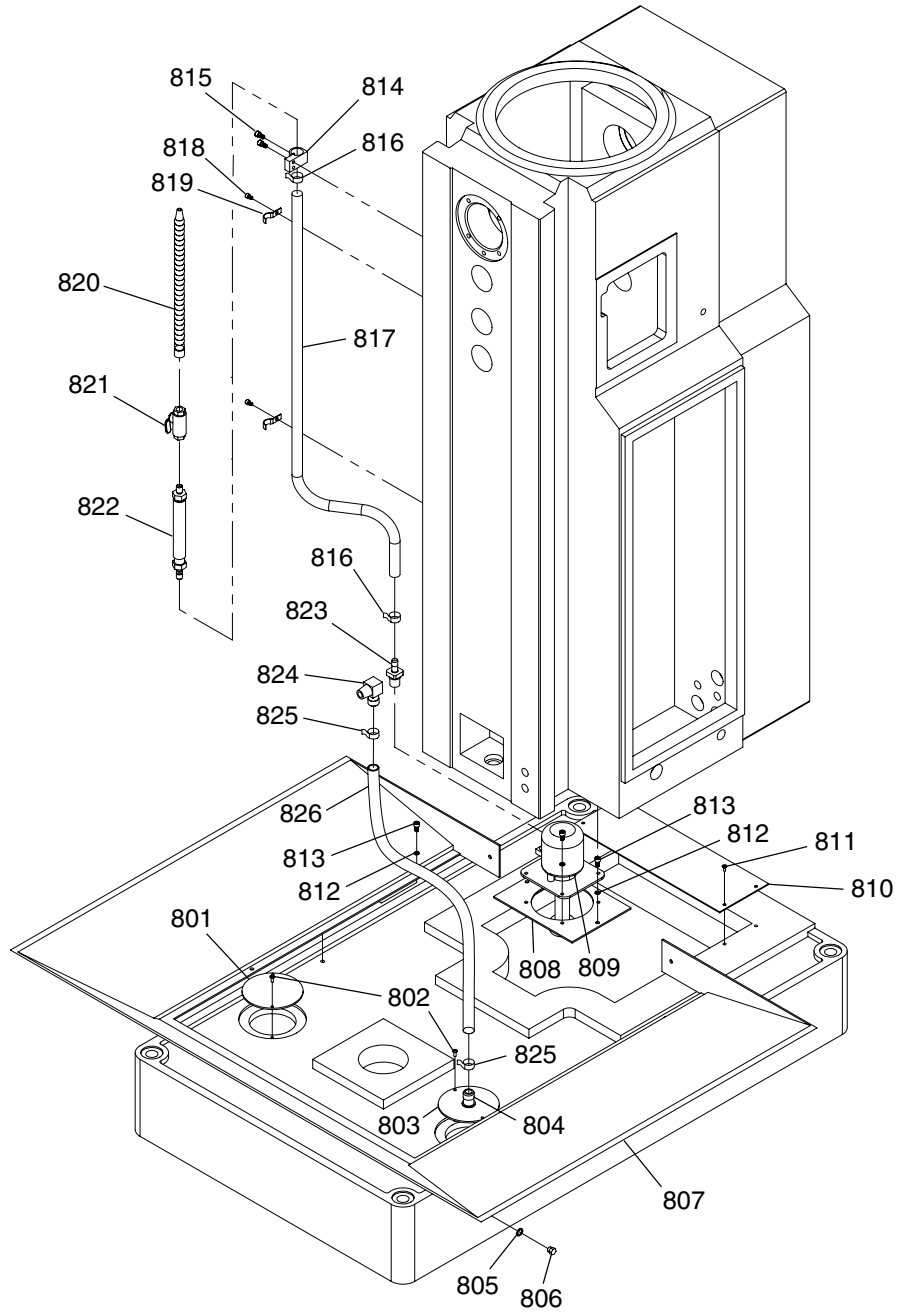
G0616 Head Parts List

REF	PART #	DESCRIPTION
698	P06160698	COMPRESSION SPRING
699	P06160699	COVER
700	P06160700	SHAFT
701	P06160701	LOCK BOLT
702	P06160702	HANDLE
703	P06160703	GEAR SHAFT 12T
704	PK129M	KEY 8 X 8 X 36
705	P06160705	GEAR 43T
706	PFH07M	FLAT HD SCR M5-.8 X 10
707	P06160707	BRACKET
708	P6202	BALL BEARING 6202ZZ
709	P06160709	GEAR 27T
710	P06160710	PLUG
711	PK19M	KEY 5 X 5 X 14
712	P06160712	GEAR SHAFT 20/13T
713	P06160713	FLANGE
714	P06160714	GEAR 29T
715	PK101M	KEY 6 X 6 X 14
716	P06160716	GEAR 43T
717	P06160717	GEAR 36T

REF	PART #	DESCRIPTION
718	PR30M	EXT RETAINING RING 36MM
719	P51101	THRUST BEARING 51101
720	P06160720	COLLAR
721	P06160721	THREADED PIN M6-1 X 8
722	P06160722	BALL BEARING 61905
723	P06160723	WORM GEAR
724	P06160724	HANDLE
725	P06160725	HANDLE HUB
726	PSS16M	SET SCREW M8-1.25 X 10
727	P06160727	BUSHING
728	P06160728	O-RING 11.8 X 1.8
729	P06160729	TAPER PIN 4 X 45
730	P06160730	SHAFT
731	P06160731	TAPER PIN 4 X 30
732	P06160732	ROCKER ARM
733	P06160733	SHIFTING FORK
734	P06160734	BUSHING
735	P06160735	SHAFT
736	P06160736	SHIFTING FORK



G0616 Coolant



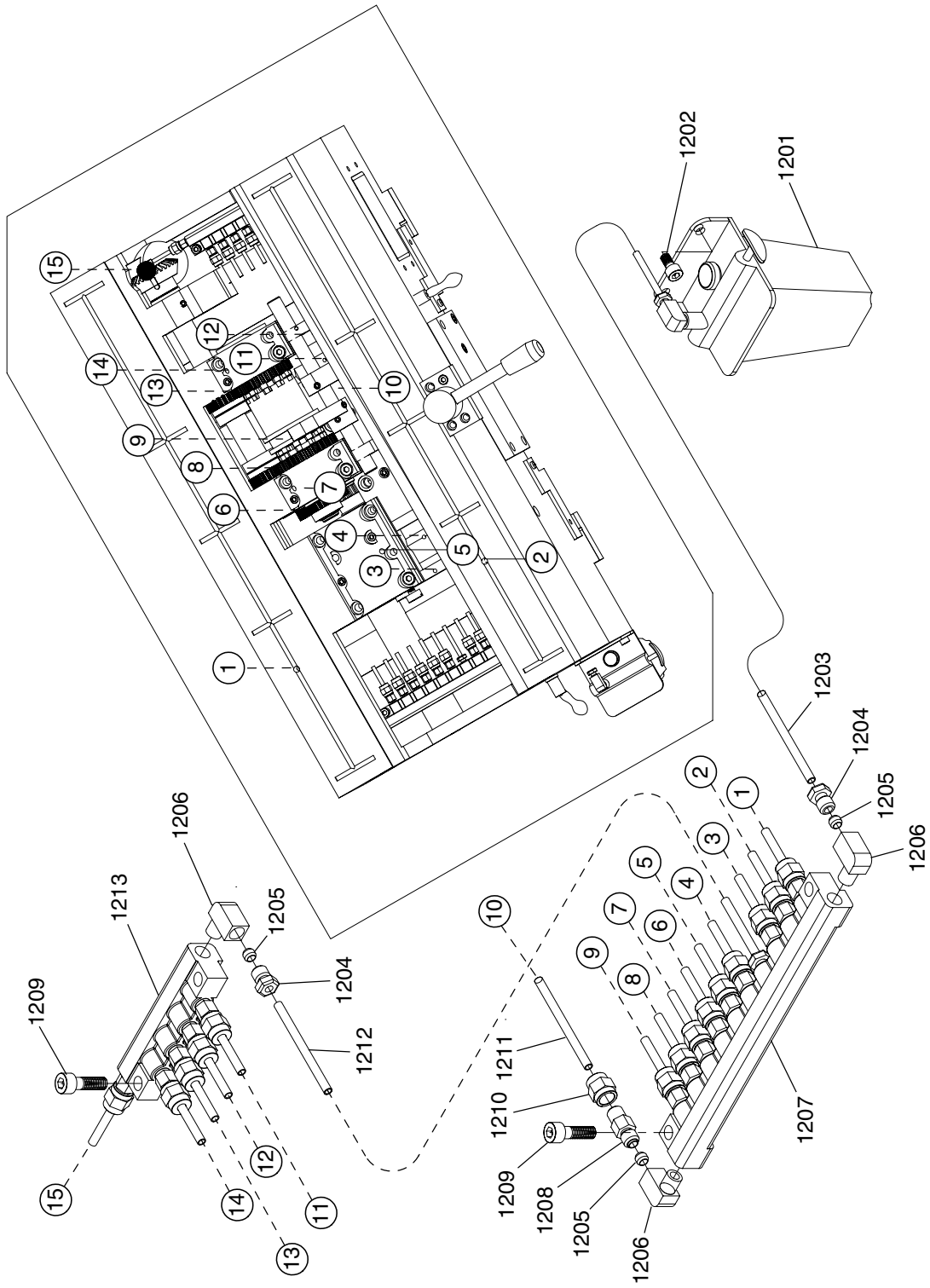
G0616 Coolant Parts List

REF	PART #	DESCRIPTION
801	P06160801	COVER
802	PFH19M	FLAT HD SCR M4-.7 X 10
803	P06160803	COVER
804	P06160804	PIPE UNION
805	P06160805	COPPER WASHER 10MM
806	P06160806	OIL PLUG
807	P06160807	SPLASH PAN
808	P06160808	MOTOR MOUNT
809	P06160809	MOTOR .12HP/220V/3-PH
810	P06160810	COVER
811	PFH19M	FLAT HD SCR M4-.7 X 10
812	PLW03M	LOCK WASHER 6MM
813	PSB26M	CAP SCREW M6-1 X 12

REF	PART #	DESCRIPTION
814	P06160814	BRACKET
815	PSB01M	CAP SCREW M6-1 X 16
816	P06160816	CLAMP
817	P06160817	TUBING 3/8" X 1500MM
818	PSB03M	CAP SCREW M5-.8 X 8
819	P06160819	PIPE CLIP
820	P06160820	COOLANT NOZZLE
821	P06160821	VALVE
822	P06160822	PIPE CONNECTOR
823	P06160823	PIPE UNION
824	P06160824	PIPE UNION
825	P06160825	CLAMP
826	P06160826	TUBING 3/4" X 1550MM



G0616 One-Shot Oiler



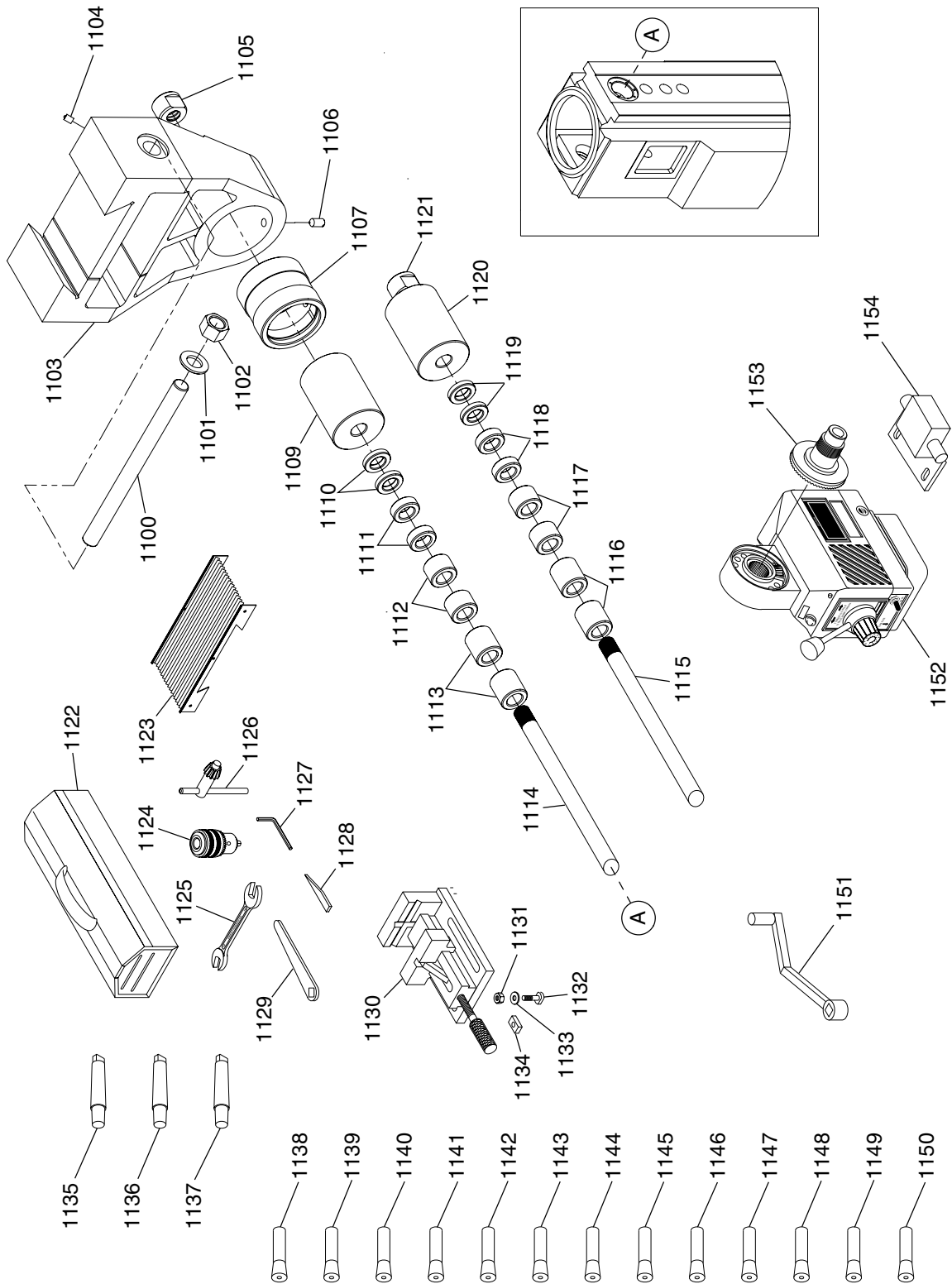
G0616 One-Shot Oiler Parts List

REF	PART #	DESCRIPTION
1201	P06161201	ONE-SHOT OILER
1202	PSB06M	CAP SCREW M6-1 X 25
1203	P06161203	OIL PIPE
1204	P06161204	PIPE UNION
1205	P06161205	TAPER SLEEVE
1206	P06161206	ANGLE COUPLING
1207	P06161207	OIL DISTRIBUTOR 10-POSITION

REF	PART #	DESCRIPTION
1208	P06161208	FLOW REGULATOR
1209	PSB06M	CAP SCREW M6-1 X 25
1210	P06161210	COLLAR NUT
1211	P06161211	NYLON TUBE
1212	P06161212	COPPER TUBE
1213	P06161213	OIL DISTRIBUTOR 4-POSITION



G0615/G0616 Accessories



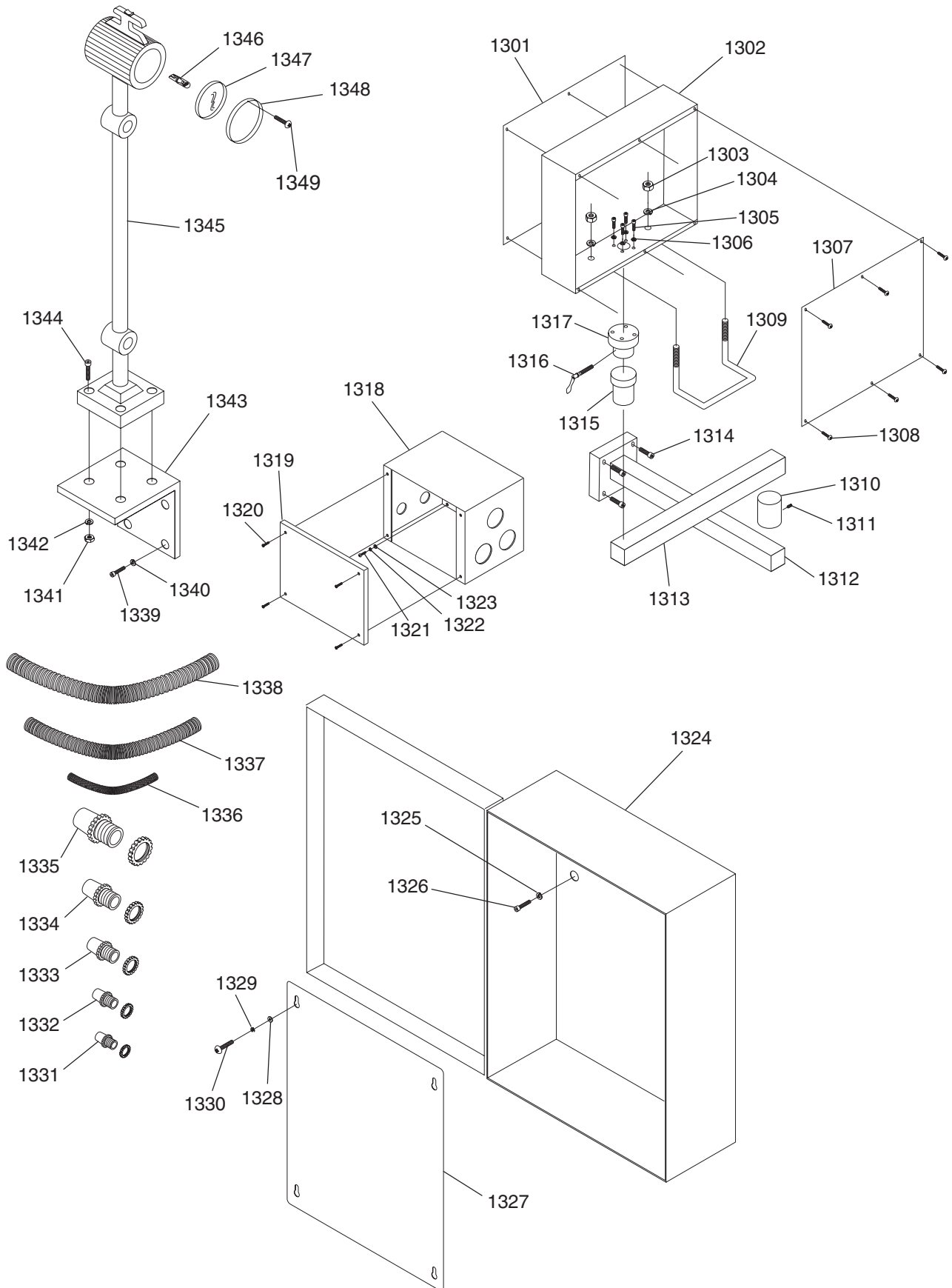
G0615/G0616 Accessories Parts List

REF	PART #	DESCRIPTION
1100	P06151100	CLAMP ROD (G0615)
1100	P06161100	CLAMP ROD (G0616)
1101	PW08M	FLAT WASHER 16MM
1102	PN13M	HEX NUT M16-2
1103	P06151103	HORIZ ARBOR SUPPORT (G0615)
1103	P06161103	HORIZ ARBOR SUPPORT (G0616)
1104	P06151104	BALL OILER 6MM
1105	P06151105	ARBOR NUT 7/8-9
1106	PSS06M	SET SCREW M8-1.25 X 16
1107	P06151107	SUPPORTING SLEEVE (G0615)
1107	P06161107	SUPPORTING SLEEVE (G0616)
1109	P06151109	ARBOR BUSHING 1" (G0615)
1109	P06161109	ARBOR BUSHING 1" (G0616)
1111	P06151111	ARBOR SPACER 1" X 20MM
1112	P06151112	ARBOR SPACER 1" X 30MM
1113	P06151113	ARBOR SPACER 1" X 60MM
1114	P06151114	ARBOR 1"
1115	P06151115	ARBOR 1-1/4"
1116	P06151116	ARBOR SPACER 1-1/4" X 60MM
1117	P06151117	ARBOR SPACER 1-1/4" X 30MM
1118	P06151118	ARBOR SPACER 1-1/4" X 20MM
1119	P06151119	ARBOR SPACER 1-1/4" X 10MM
1120	P06151120	ARBOR BUSHING 1-1/4" (G0615)
1120	P06161120	ARBOR BUSHING 1-1/4" (G0616)
1121	P06151121	ARBOR NUT 1-8
1122	P06151122	TOOL BOX
1123	P06151123	WAY COVER
1124	P06151124	KEYED CHUCK 1-16MM B18
1125	P06151125	COMBO WRENCH 21/24MM

REF	PART #	DESCRIPTION
1126	P06151126	CHUCK KEY
1127	PAW05M	HEX WRENCH 5MM
1128	P06151128	DRIFT KEY
1129	P06151129	SQUARE NUT WRENCH 21MM
1130	P06151130	ROTATING VISE
1131	PN09M	HEX NUT M12-1.75
1132	P06151132	T-BOLT M12-1.75 X 50
1133	PW06M	FLAT WASHER 12MM
1134	P06151134	T-SLOT KEY
1135	P06151135	ADAPTOR R8-B18
1136	P06151136	ADAPTOR R8-MT2
1137	P06151137	ADAPTOR R8-MT3
1138	P06151138	R8 COLLET 1/8"
1139	P06151139	R8 COLLET 3/16"
1140	P06151140	R8 COLLET 1/4"
1141	P06151141	R8 COLLET 5/16"
1142	P06151142	R8 COLLET 3/8"
1143	P06151143	R8 COLLET 7/16"
1144	P06151144	R8 COLLET 1/2"
1145	P06151145	R8 COLLET 9/16"
1146	P06151146	R8 COLLET 5/8"
1147	P06151147	R8 COLLET 11/16"
1148	P06151148	R8 COLLET 3/4"
1149	P06151149	R8 COLLET 13/16"
1150	P06151150	R8 COLLET 7/8"
1151	P06151151	RAM TRAVEL CRANK
1152	P06151152	POWER FEED ASSEMBLY
1153	P06151153	BRASS DRIVE GEAR
1154	P06151154	POWER FEED LIMIT SWITCH



G0615/G0616 Electrical Hardware



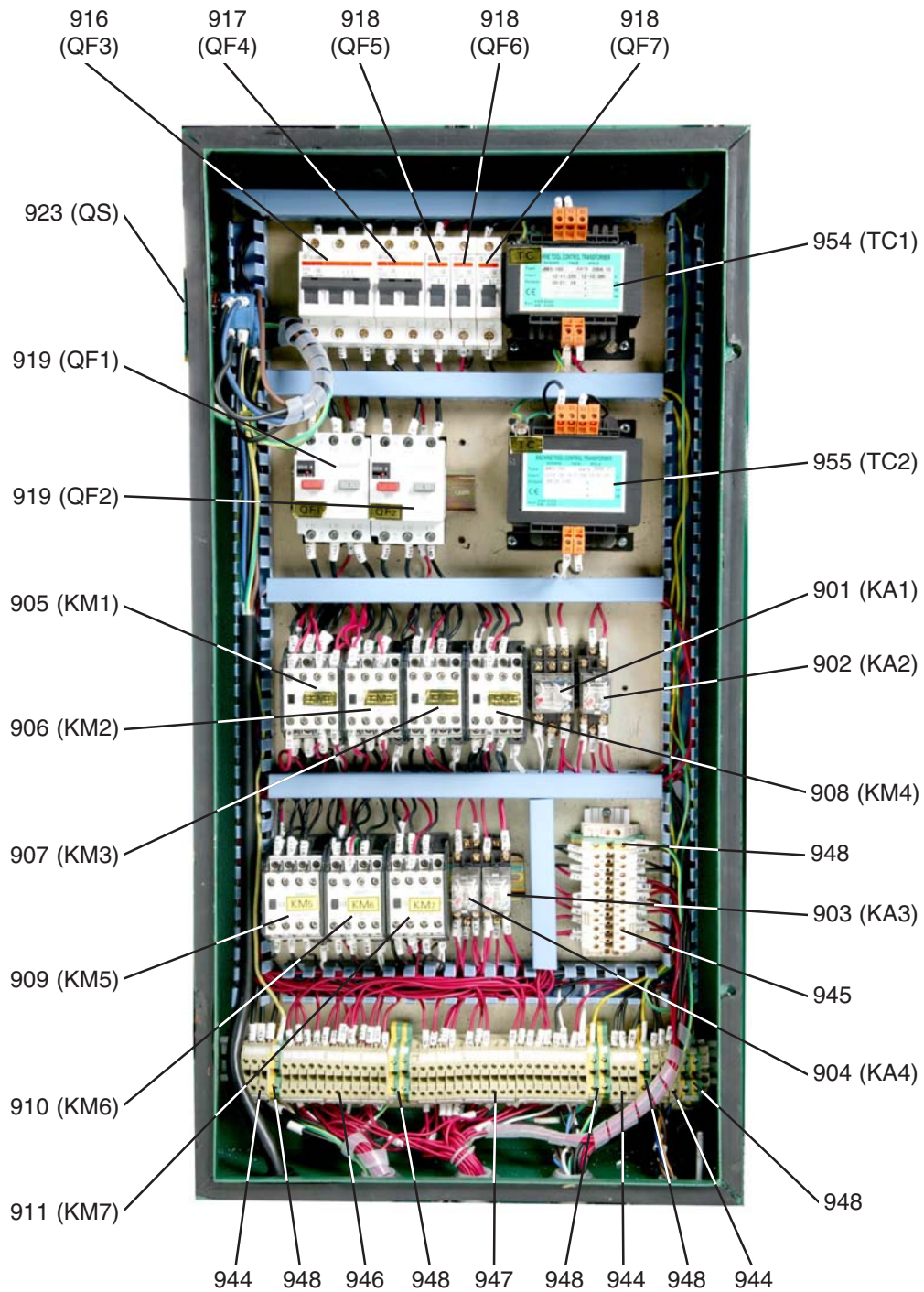
G0615/G0616 Electrical Hardware List

REF	PART #	DESCRIPTION
1301	P06151301	CONTROL REAR PANEL
1302	P06151302	CONTROL BOX
1303	PN03M	HEX NUT M8-1.25
1304	PLW04M	LOCK WASHER 8MM
1305	PSB27M	CAP SCREW M6-1 X 14
1306	PLW03M	LOCK WASHER 6MM
1307	P06151307	CONTROL FRONT PANEL
1308	PS07M	PHLP HD SCR M4-.7 X 8
1309	P06151309	CONTROL PANEL HANDLE
1310	P06151310	BUSHING
1311	PSS51M	SET SCREW M4-.7 X 8
1312	P06151312	MOUNTING ARM
1313	P06151313	SWING ARM
1314	PSB76M	CAP SCREW M8-1.25 X 18
1315	P06151315	BUSHING
1316	P06151316	LOCKING BOLT
1317	P06151317	CONTROL BOX BASE
1318	P06151318	VERTICAL SWITCH BOX
1319	P06151319	VERTICAL SWITCH BOX COVER
1320	PFH31M	FLAT HD SCR M4-.7 X 8
1321	PS08M	PHLP HD SCR M5-.8 X 12
1322	PLW01M	LOCK WASHER 5MM
1323	PW02M	FLAT WASHER 5MM
1324	P06151324	ELECTRICAL CABINET (G0615)
1324	P06161324	ELECTRICAL CABINET (G0616)
1325	PLW01M	LOCK WASHER 5MM

REF	PART #	DESCRIPTION
1326	PS09M	PHLP HD SCR M5-.8 X 10
1327	P06151327	ELECTRICAL BOARD (G0615)
1327	P06161327	ELECTRICAL BOARD (G0616)
1328	PW02M	FLAT WASHER 5MM
1329	PLW01M	LOCK WASHER 5MM
1330	PS09M	PHLP HD SCR M5-.8 X 10
1331	P06151331	STRAIN RELIEF 6.5MM
1332	P06151332	STRAIN RELIEF 13MM
1333	P06151333	STRAIN RELIEF 15MM
1334	P06151334	STRAIN RELIEF 20MM
1335	P06151335	STRAIN RELIEF 25MM
1336	P06151336	ELECTRICAL CONDUIT 10MM
1337	P06151337	ELECTRICAL CONDUIT 15MM
1338	P06151338	ELECTRICAL CONDUIT 20MM
1339	PSB53M	CAP SCREW M5-.8 X 18
1340	PLW01M	LOCK WASHER 5MM
1341	PN06M	HEX NUT M5-.8
1342	PLW01M	LOCK WASHER 5MM
1343	P06151343	LAMP MOUNTING BRACKET
1344	PSB33M	CAP SCREW M5-.8 X 12
1345	P06151345	HALOGEN LAMP
1346	P06151346	HALOGEN BULB
1347	P06151347	BULB COVER
1348	P06151348	BULB COVER RETAINER
1349	PS55M	PHLP HD SCR M3-.5 X 10



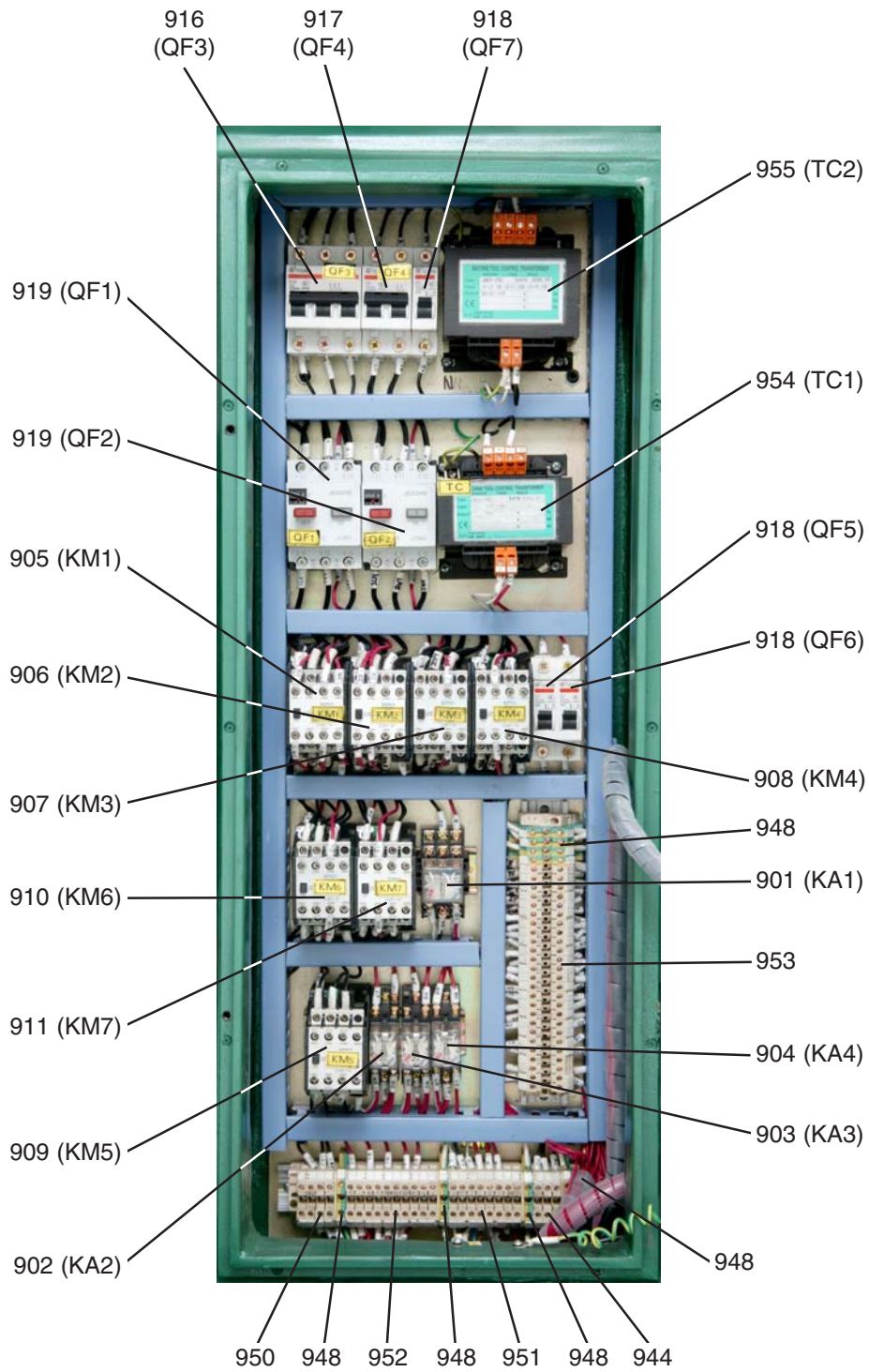
G0615 Electrical Box



For wiring diagram schematics, refer to Pages 66–68.



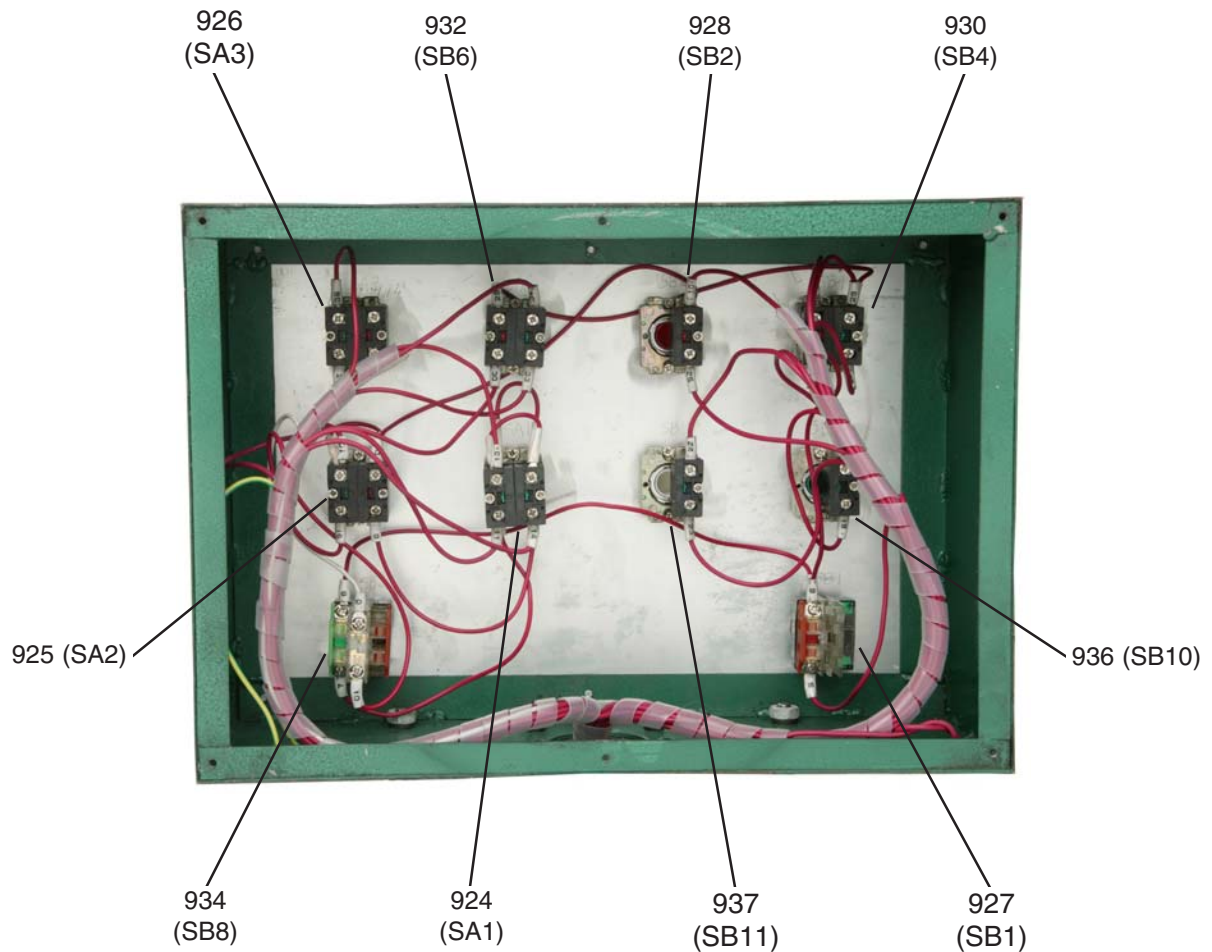
G0616 Electrical Box



For wiring diagram schematics, refer to Pages 66–68.



G0615/G0616 Control Panel



For wiring diagram schematics, refer to Page 67.



G0615/G0616 Electrical Components (A)

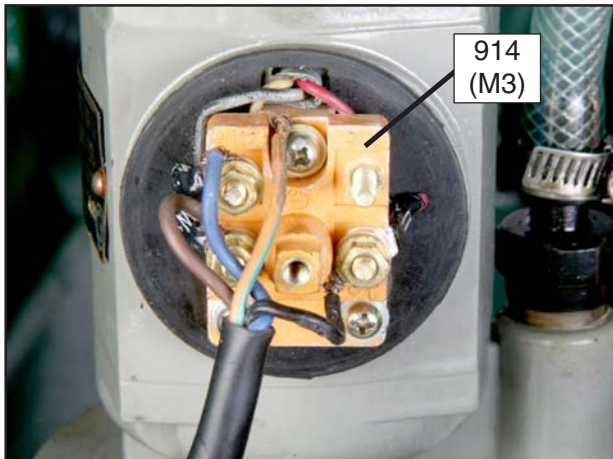


Figure 106. Coolant pump wiring connections.

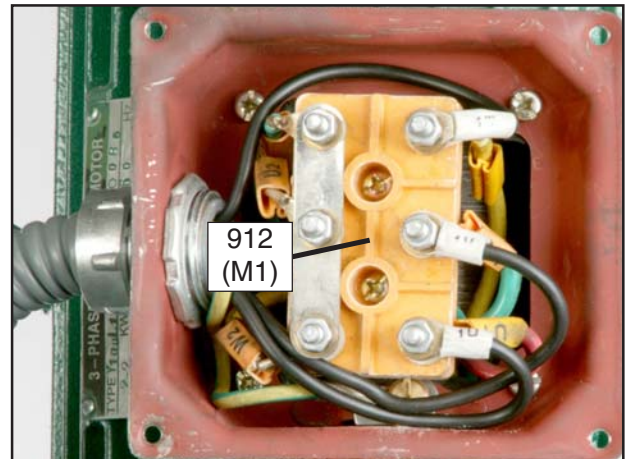


Figure 108. Vertical spindle motor wiring.

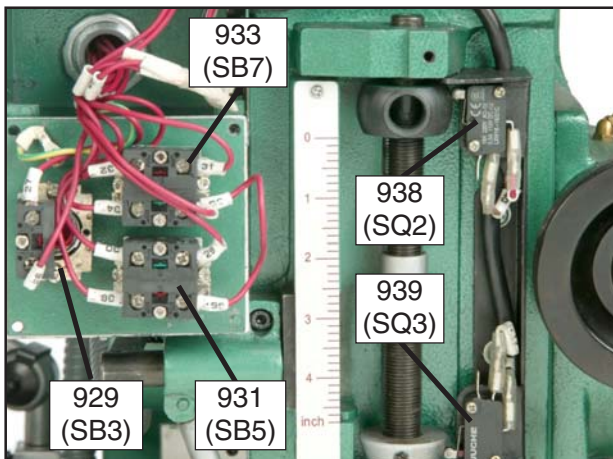


Figure 107. Vertical spindle controls on headstock and auto-downfeed reverse switch wiring.

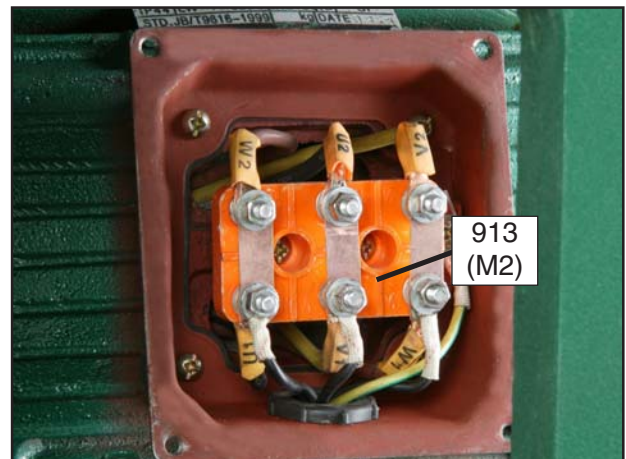


Figure 109. Horizontal spindle motor wiring.



G0615/G0616 Electrical Components (B)

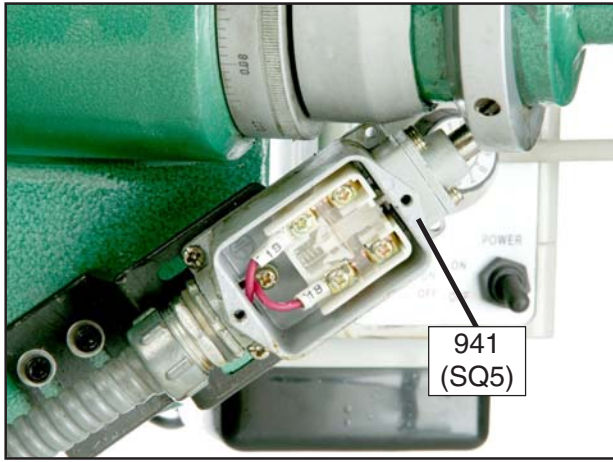


Figure 110. Z-axis crank safety switch wiring.

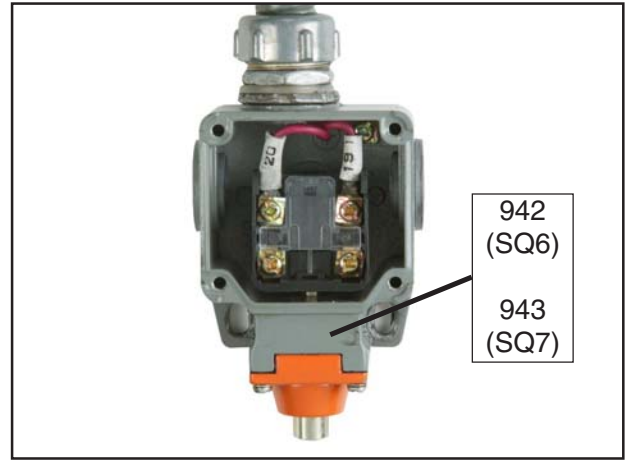


Figure 113. Z-axis limit switch wiring.

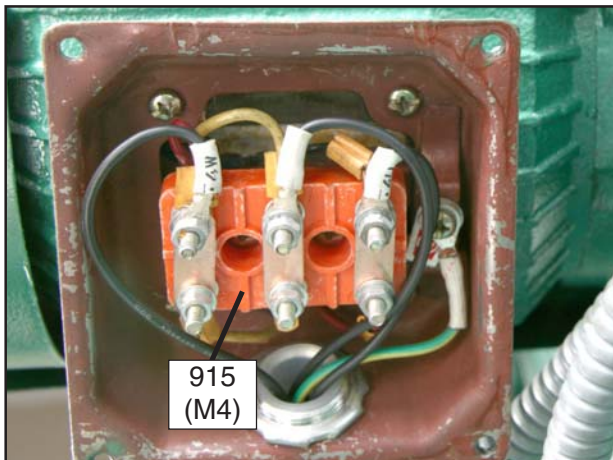


Figure 111. Z-axis power feed motor wiring.

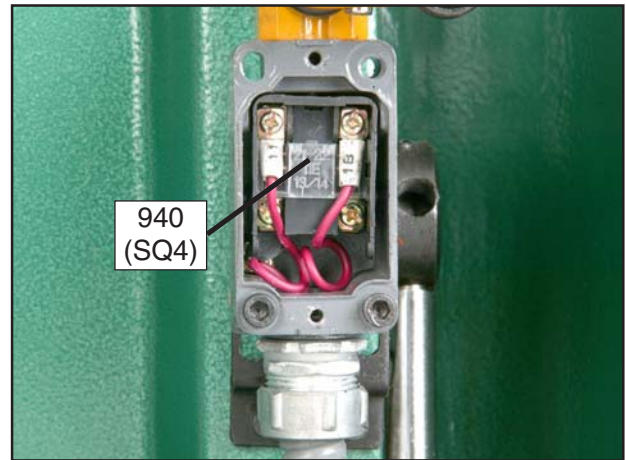


Figure 114. Z-axis lock safety switch wiring.

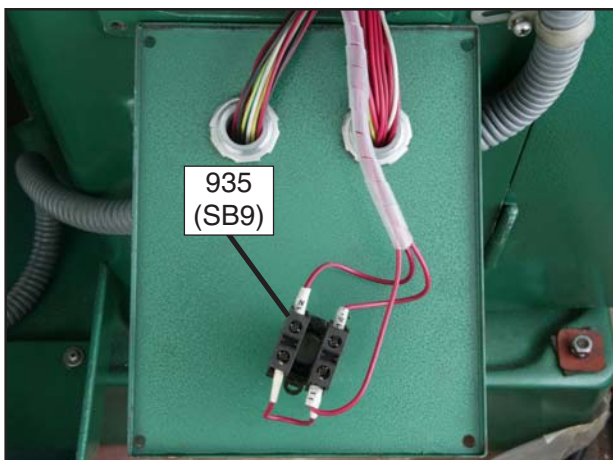


Figure 112. Model G0615 horizontal spindle jog switch wiring.

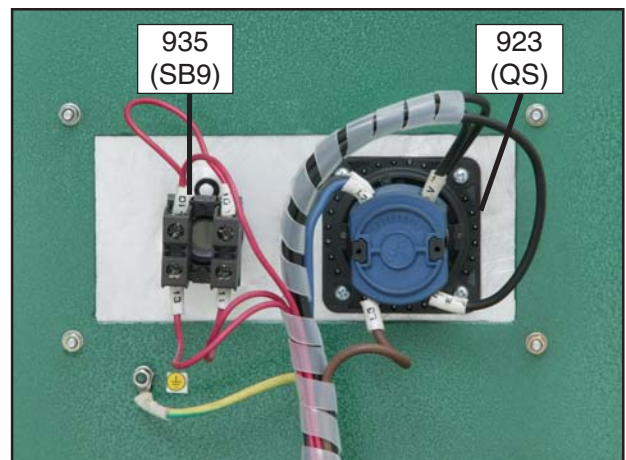


Figure 115. Model G0616 horizontal spindle jog button and main power switch wiring.



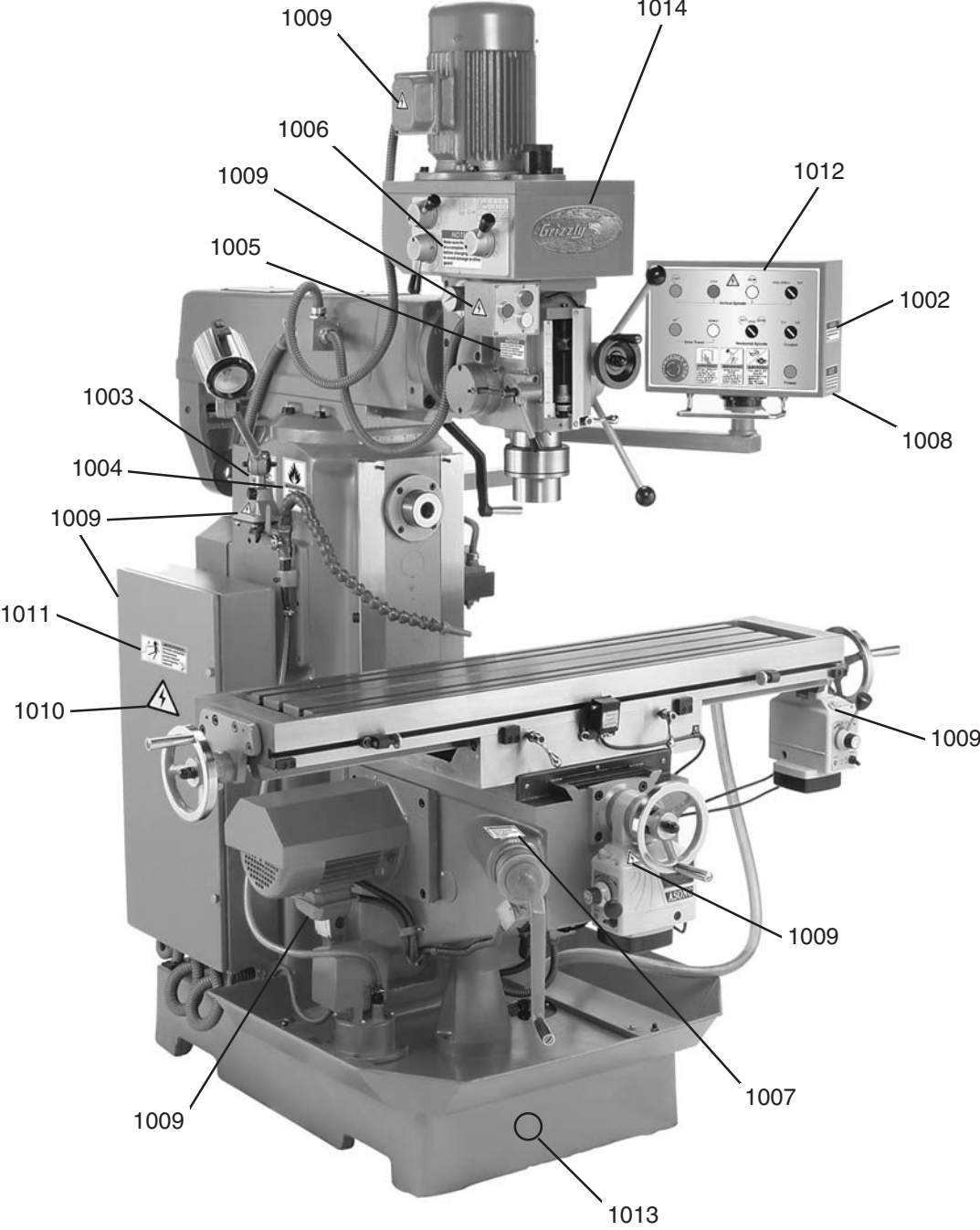
G0615/G0616 Electric Parts List

REF	PART #	DESCRIPTION
901	P06150901	RELAY HH63P
902	P06150902	RELAY HH52P
903	P06150902	RELAY HH52P
904	P06150902	RELAY HH52P
905	P06150905	CONTACTOR CJX1-12/22
906	P06150905	CONTACTOR CJX1-12/22
907	P06150905	CONTACTOR CJX1-12/22
908	P06150905	CONTACTOR CJX1-12/22
909	P06150905	CONTACTOR CJX1-12/22
910	P06150905	CONTACTOR CJX1-12/22
911	P06150905	CONTACTOR CJX1-12/22
912	P06150912	VERT MOTOR TERMINAL BLOCK
913	P06150913	HORIZ MOTOR TERMINAL BLOCK
914	P06150914	COOLANT PUMP TERMINAL BLOCK
915	P06150915	Z-AXIS MOTOR TERMINAL BLOCK
916	P06150916	CIRCUIT BREAKER 415V 3-P
917	P06150917	CIRCUIT BREAKER 240/415V 2-P
918	P06150918	CIRCUIT BREAKER 240/415V 1-P
919	P06150919	THERMAL OVERLOAD JCM5 3-P
923	P06150923	MAIN POWER SWITCH JCH-13
924	P06150924	HORIZONTAL SPINDLE SWITCH
925	P06150925	COOLANT PUMP SWITCH
926	P06150926	DRILL/TAP SWITCH
927	P06150927	EMERGENCY STOP BUTTON
928	P06150928	VERT SPINDLE STOP BUTTON
929	P06150929	VERT SPINDLE STOP BUTTON

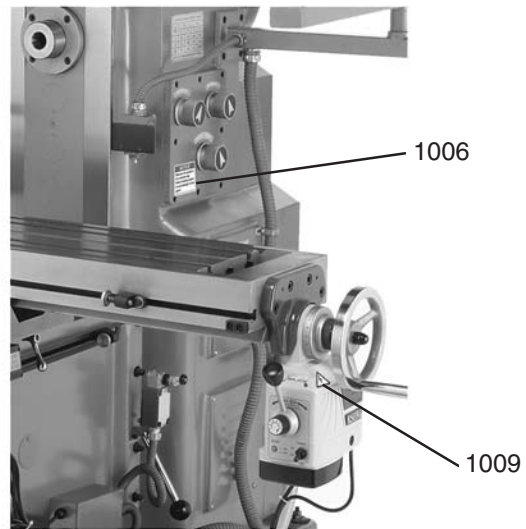
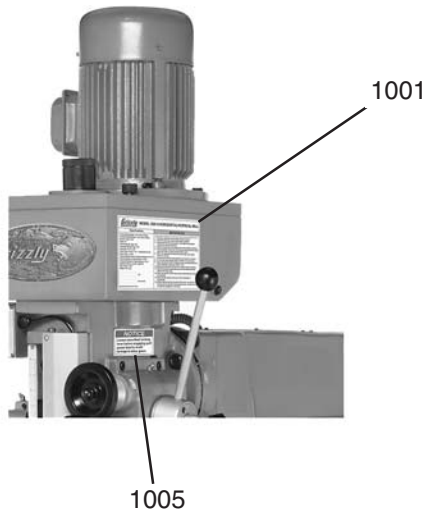
REF	PART #	DESCRIPTION
930	P06150930	VERT SPINDLE CW BUTTON
931	P06150931	VERT SPINDLE CW BUTTON
932	P06150932	VERT SPINDLE CCW BUTTON
933	P06150933	VERT SPINDLE CCW BUTTON
934	P06150934	POWER ON BUTTON/LAMP
935	P06150935	HORIZ SPINDLE JOG BUTTON
936	P06150936	Z-AXIS UP BUTTON
937	P06150937	Z-AXIS DOWN BUTTON
938	P06150938	UPPER REVERSE SWITCH
939	P06150939	LOWER REVERSE SWITCH
940	P06150940	Z-AXIS LOCK SAFETY SWITCH
941	P06150941	Z-AXIS CRANK SAFETY SWITCH
942	P06150942	Z-AXIS UPPER LIMIT SWITCH
943	P06150942	Z-AXIS LOWER LIMIT SWITCH
944	P06150944	TERMINAL BLOCK 3-P
945	P06150945	TERMINAL BLOCK 11-P (G0615)
946	P06150946	TERMINAL BLOCK 12-P (G0615)
947	P06150947	TERMINAL BLOCK 20-P (G0615)
948	P06150948	GROUND BLOCK 1-P
950	P06160950	TERMINAL BLOCK 4-P (G0616)
951	P06160951	TERMINAL BLOCK 8-P (G0616)
952	P06160952	TERMINAL BLOCK 10-P (G0616)
953	P06160953	TERMINAL BLOCK 20-P (G0616)
954	P06150954	CONTROL SYS TRANSFORMER 24V
955	P06150955	POWER FEED TRANSFORMER 110V



G0615/G0616 Label Placement (A)



G0615/G0616 Label Placement (B) & List



REF	PART #	DESCRIPTION
1001	P06151001	MACHINE ID LABEL (G0615)
1001	P06161001	MACHINE ID LABEL (G0616)
1002	P06151002	COOLANT PUMP NOTICE LABEL
1003	P06151003	BIOLOGICAL HAZARD LABEL
1004	P06151004	EXPLOSION HAZARD LABEL
1005	P06151005	DOWNFEED LOCK NOTICE LABEL
1006	P06151006	CHANGE SPEED NOTICE LABEL
1007	P06151007	HAND CRANK WARNING LABEL

REF	PART #	DESCRIPTION
1008	P06151008	SAFE OPERATION NOTICE LABEL
1009	PLABEL-14	SMALL ELECTRICITY LABEL
1010	P06151010	LARGE ELECTRICITY LABEL
1011	P06151011	SHOCK HAZARD WARNING LABEL
1012	P06151012	CONTROL PANEL LABEL
1013	PPAINT-1	GRIZZLY GREEN TOUCH-UP PAINT
1014	G8588	GRIZZLY NAMEPLATE SMALL

WARNING

Safety labels warn about machine hazards and ways to prevent injury. The owner of this machine **MUST** maintain the original location and readability of the labels on the machine. If any label is removed or becomes unreadable, **REPLACE** that label before using the machine again. Contact Grizzly at (800) 523-4777 or www.grizzly.com to order new labels.



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| <input type="checkbox"/> Hand Loader | <input type="checkbox"/> Popular Woodworking | <input type="checkbox"/> Wooden Boat |
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3. What is your annual household income?

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| <input type="checkbox"/> \$50,000-\$59,000 | <input type="checkbox"/> \$60,000-\$69,000 | <input type="checkbox"/> \$70,000+ |

4. What is your age group?

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| <input type="checkbox"/> 50-59 | <input type="checkbox"/> 60-69 | <input type="checkbox"/> 70+ |

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6. How many of your machines or tools are Grizzly?

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7. Do you think your machine represents a good value? Yes No

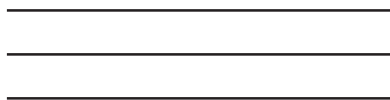
8. Would you recommend Grizzly Industrial to a friend? Yes No

9. Would you allow us to use your name as a reference for Grizzly customers in your area?
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